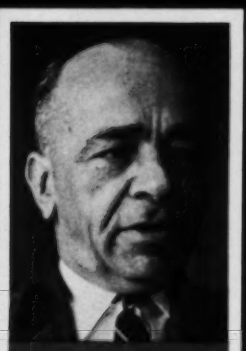
STEEL The Metalworking Weekly

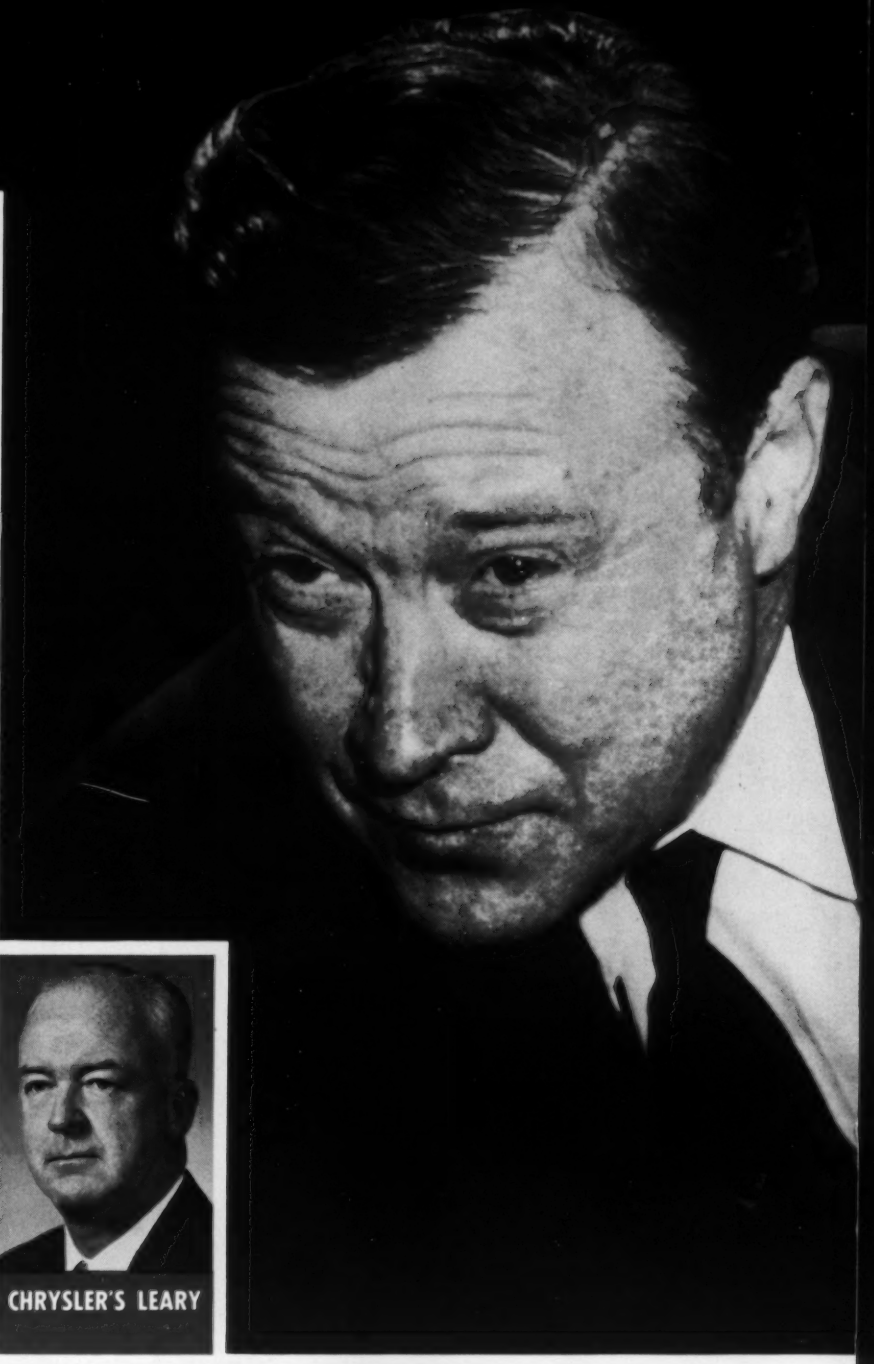
MAY 29, 1961



FORD'S CASSIDY

GM'S SEATON

CHRYSLER'S LEARY



Auto negotiators hold strong bargaining hands as . . .

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Sensible Tolerances, Finishes Pay Off . . 78

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UNIVERSAL GRINDING

Reversing the Cost Trend

by Clifford G. Menard
Consulting Engineer
The Heald Machine Company

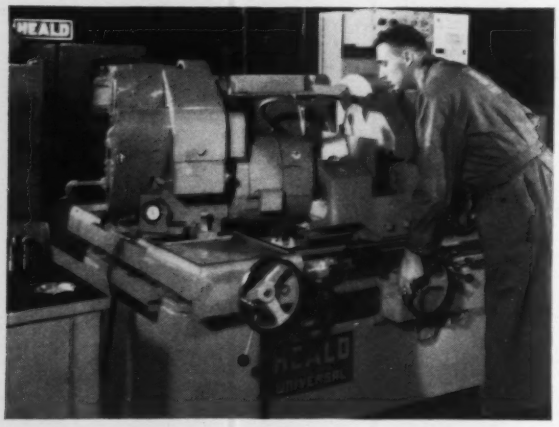
Just about everything costs *more* these days—*much* more than it did 10 or 15 years ago. And when we first decided to build a completely new Universal Internal Grinding Machine that would not only "hold the line", but actually *reverse* the upward cost trend, many an eyebrow was lifted in disbelief. Some said it couldn't be done. Others felt that major economies could be made only with a big sacrifice in performance.

Admittedly, the task was not a simple one. In order to cut costs without cutting quality, we had to make a complete re-evaluation not only of the basic machine design, but of every step of our manufacturing operations as well. But we found that a large number of cost savings could be made, by utilizing the latest advances in machine design and streamlining production methods to eliminate as many manual operations as possible. Although most of the savings were relatively small individually, they added up to a major reduction in manufacturing cost.

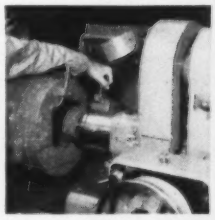
This better, more versatile general purpose grinder costs about *half* as much as comparable machines today, and *less* than similar machines (with fewer features) cost in 1947!

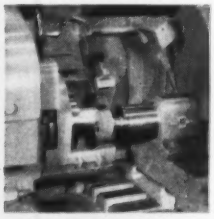
Here's how some of the savings were made. The use of hydrostatic table ways eliminated an expensive booster arrangement in the hand table feed. An externally-mounted valve "package", on the front of the machine, simplified the hydraulic power arrangement and eliminated all but essential units in the hydraulic system. And with all hydraulics outside of the machine, the base is mechanically stronger and less expensive to produce because there are fewer holes and less surface area to finish. Furthermore, simplified basic engineering and construction make it possible to build this standard machine with standard arrangement on a STOCK basis resulting in shorter deliveries.

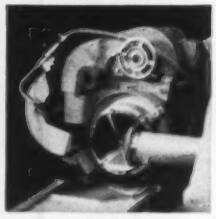
These and other refinements enabled us to make the 273A a truly universal machine with greater capacity, easier operation, and inherent precision that holds tolerances within .0001″ in normal production and .000050″ in special cases. Yet its 1947 price tag puts it within the economic reach of virtually every plant or machine shop, regardless of size.



Here's the new Model 273A Universal, on display at the 1960 Machine Tool Exposition. On a steel test piece, the O.D., a straight bore, a tapered bore and the face were ground to size within .0001″ at a single chucking.



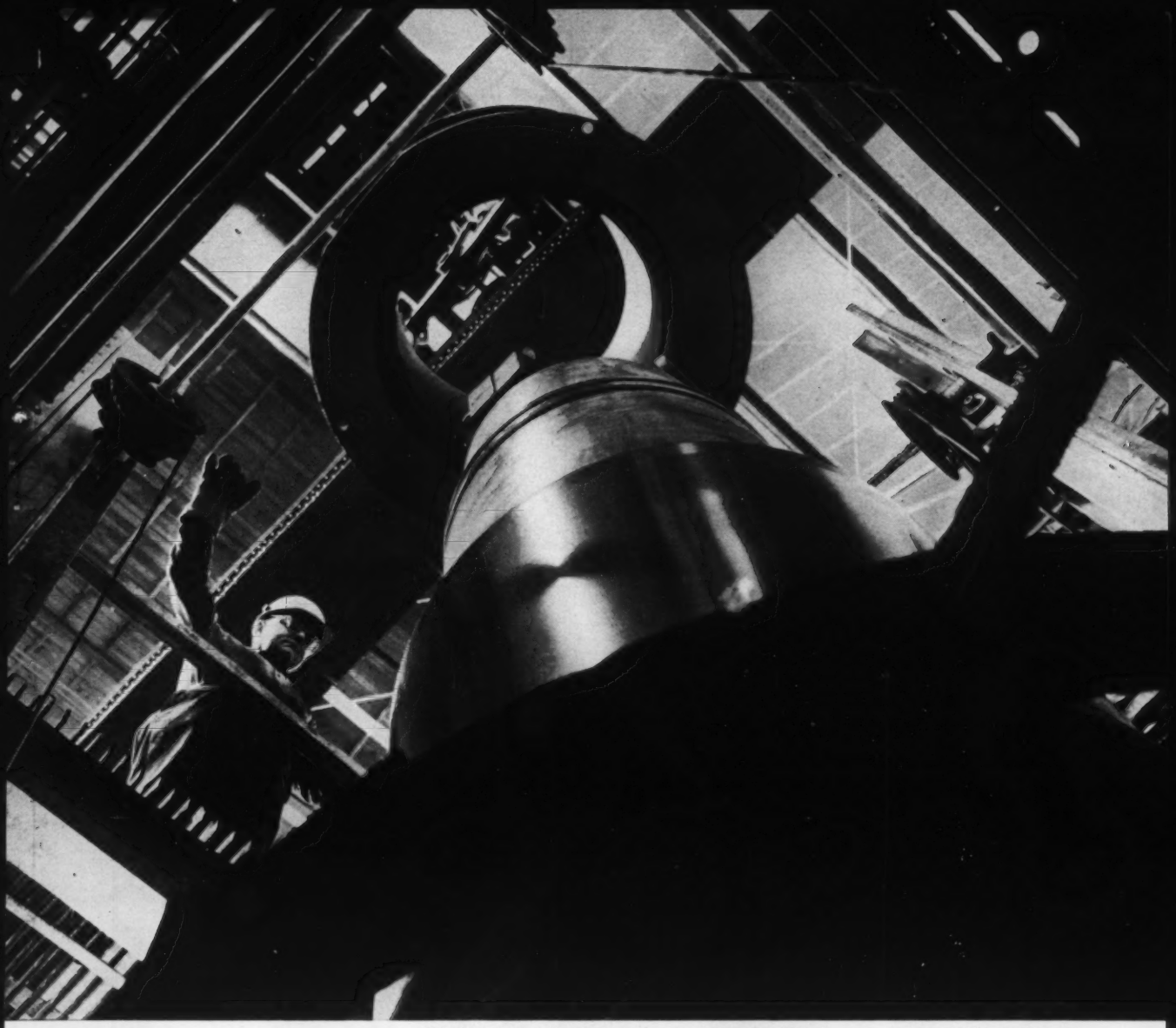




Workhead swivel of 90°, several wheelhead positions, permit I.D., O.D. and rotary surface grinding of parts up to 12″ in diameter. Vari-speed workhead drive is infinitely adjustable from 75 to 450 rpm.

Ask your Heald Engineer for the complete UNIVERSAL story. Then compare its performance and cost with any other similar machine available today!

THE HEALD MACHINE COMPANY
Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts



This forged alloy-steel sleeve is first heated to about 800 deg in order to expand its ID. Then it is lowered onto arbor, as shown. When the sleeve cools and contracts, it bites into arbor forming a tight fit.

Get more tonnage from back-up roll sleeves . . . make sure they're forged alloy steel

Our records show that a Bethlehem forged back-up roll sleeve on a modern continuous four-stand cold mill produces an average of 1,981,083 tons of cold-rolled sheets. Some have produced over 3 million tons! (And some of those are still going strong.)

Why this clear superiority over cast steel back-up rolls? Forged sleeves are denser and stronger. They offer greater resistance to spalling. You don't have to grind forged sleeves as frequently as you do cast steel back-up rolls, so you have much less downtime for roll changes. And you don't have to grind as deeply, so the sleeves last much longer. Result: more tonnage produced.

Bethlehem is well equipped to produce new sleeve and arbor assemblies; to replace used sleeves with new ones; and to install new sleeves on used back-up rolls. If you would like more information, get in touch with our nearest sales office. Or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

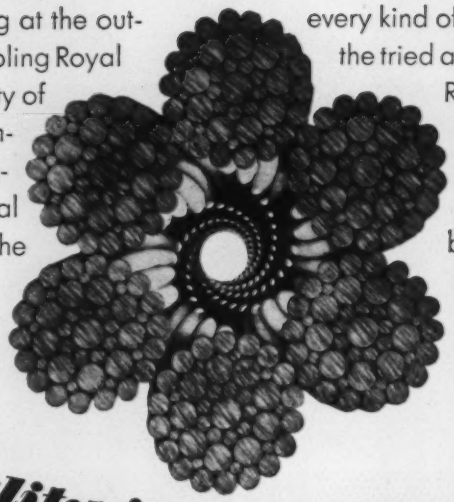
Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL

Here are two ways of looking at the outside and *inside* quality of Roebling Royal Blue Wire Rope—the uniformity of wires and strands. Their symmetry would be relatively insignificant, however, without Royal Blue's *extra* high strength. It's the combination that is the source of real wire rope savings. For long, economical service on every kind of job, there is no substitute for the tried and proven quality of Roebling Royal Blue. It pays off for *you*. Learn more about Royal Blue from your wire rope distributor, or write now for free booklet to Roebling's Wire Rope Division, Trenton 2, N.J.

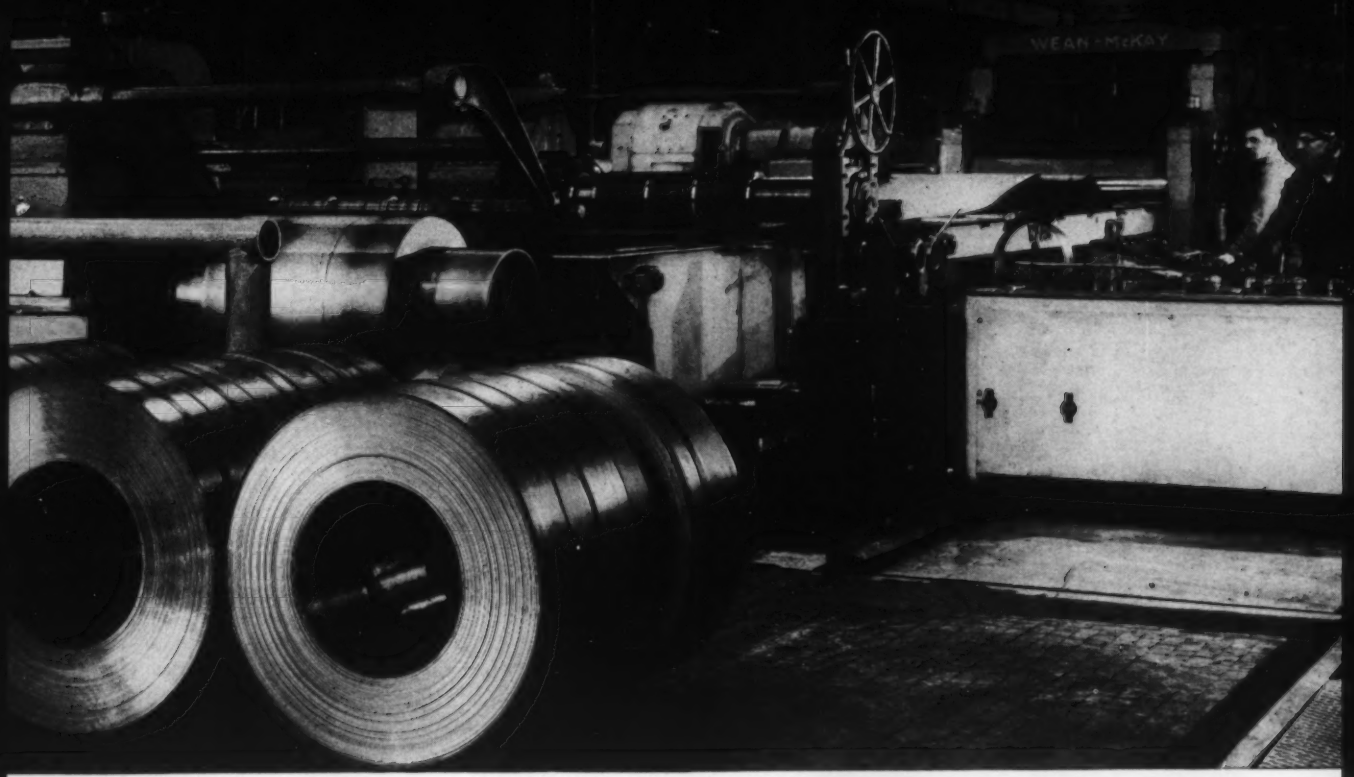


ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation.

Quality inside and outside

We put a lot of work into it—
You get a lot of work out of it

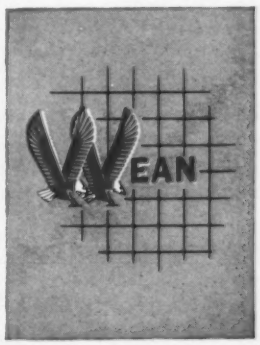


Pittsburgh Steel keeps production costs down with Wean Hot Rolled Strip Slitting Line

Pittsburgh Steel Company maintains a high production rate at its Allenport, Pennsylvania hot strip mill with this heavy duty Wean slitting line. The Wean line allows Pittsburgh Steel to follow the economical practice of rolling wide strip and then slitting it to a variety of customer-specified widths. It not only frees the hot strip mill of production runs with narrow strip, but also enables Pittsburgh to offer a wider range of strip widths.

This line can handle coils up to 60″ O.D., recoiling the slit strands on either 20″ or 24″ expanding mandrels. Strip ranging from 20″ to 60″ in width and .059″ to .188″ in thickness can be side-trimmed and slit at speeds up to 300 fpm. A processing uncoiler "works" the strip to eliminate serious cross-breaks and flattens it to permit accurate slitting.

We would like to suggest that you put Wean's extensive experience to work on your next slitting line project. You will find that in slitting, as in all phases of sheet, strip and tin plate processing, Wean "creative engineering" leads the field in design and construction of modern processing line equipment.



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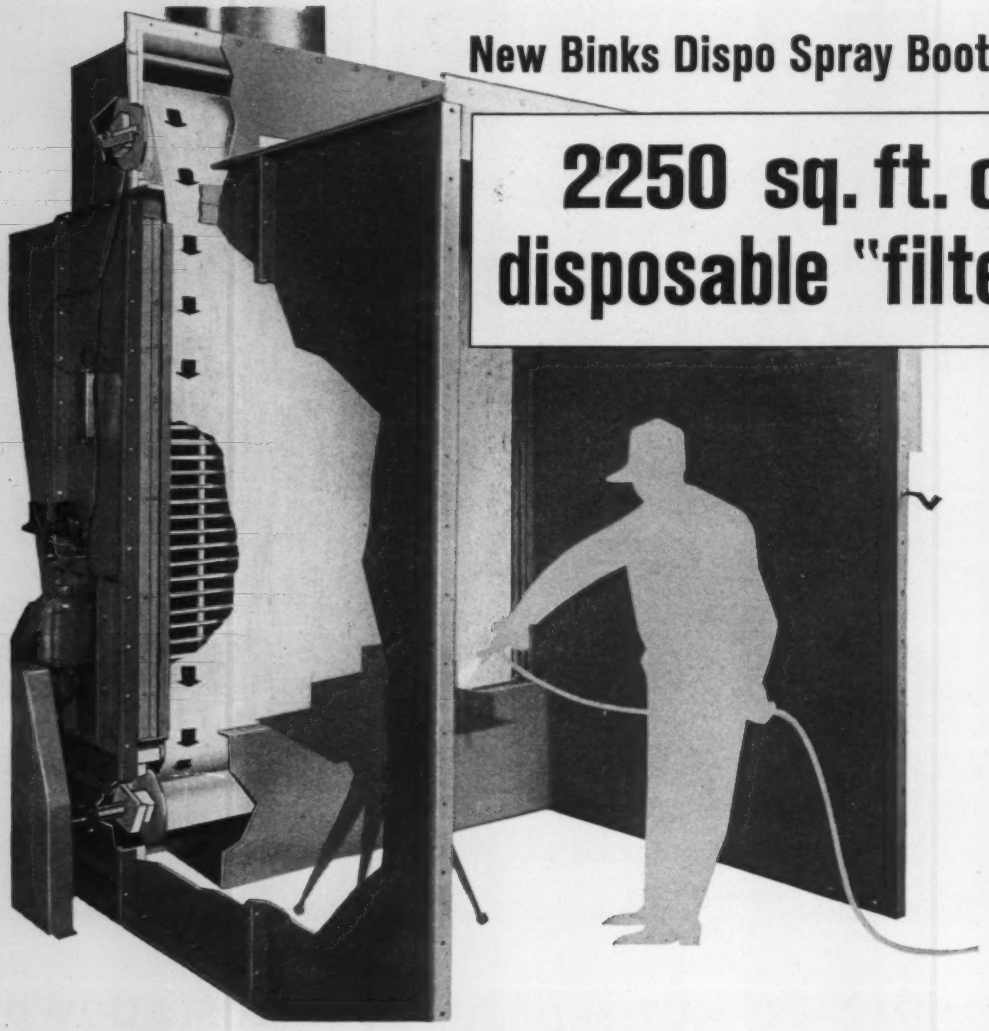


New Binks Dispo Spray Booth has...

2250 sq. ft. of disposable "filters"

automatic curtain rolls away paint overspray

The secret of the new Binks Dispo Spray Booth is a 150-yard disposable curtain which collects paint overspray . . . approximately 150 gallons...that's 2250 sq. ft. of filtering!

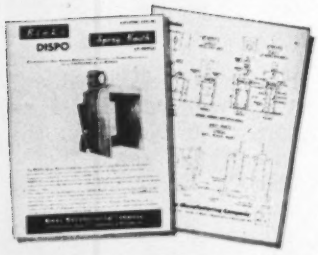
It's economical . . . a roll costs less than 2 cents per square foot... about 80% less than most paint filters cost.

It's safe...manufactured to meet NFPA fire standards... accepted by all major insuring companies.

It's automatic . . . when the curtain collects a pre-determined amount of overspray, a new section advances automatically.

It's simple...one man can change a roll in 5 minutes.

Ask about our spray painting school. Open to all . . . NO TUITION . . . covers all phases.



Ask for Bulletins A-27-14 & 15 for complete details. Your Binks Distributor has copies, or write to the address below.

Binks Manufacturing Company 3148-A Carroll Avenue, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

1237

Binks Everything for spray painting

STEEL to Launch International Edition

SAL F. MARINO

WALTER J. CAMPBELL

STEEL will launch an international edition to serve American manufacturers selling in the overseas market.

The overseas edition will be published as a monthly, starting in January, 1962. It will be distributed to metalworking companies in Western Europe, Japan, Australia, India, Africa, Central and South America.

The format of the new publication will be similar to that of STEEL, but it will accent news and technical information of particular interest to overseas metalworking manufacturers. The domestic edition of STEEL will continue to service U. S. and Canadian metalworking companies.

STEEL's co-publishers, Walter J. Campbell, editor, and Sal F. Marino, business manager, will have the same titles and responsibilities for the overseas edition.

Specialists in world markets will be added to the editorial and circulation staffs of the international magazine. Advertising sales will be handled by the STEEL sales staff.

End of an Inferiority Complex

We joined a covey of STEEL editors earlier this month for some indoctrination on the concept and uses of computers. The editors weren't after any particular story. They just wanted to keep abreast of developments, and Burroughs Corp.'s Cleveland sales office generously provided the help.

Frankly, we were pretty much at sea during most of the discussion, but we felt encouraged by one development: Burroughs people kept referring to their complex marvels as "idiots."

All computers are idiots because they can do only what they are told to do by humans. They can create nothing. They can solve only those problems put to them first by a person. They can't really think; they can just do arithmetic at incredible speeds.

With that reassurance, we think we'll bring a better mental attitude to our second indoctrination on computers. After all, the machines are nothing but idiots.

Short Message

The tersest dispatch Ernie Pyle ever filed during World War II was one word. And it was literally filed, or scratched, onto a black Zippo lighter owned by Donald C. Hyde, now STEEL's advertising representative in the Detroit area.

It came about like this: Ernie and Don were aboard the same ship during a Pacific operation. They were headed for an unknown destination. Don asked Ernie if he knew where they were going. The noted war correspondent took Don's Zippo and scratched something on it, asking him not to peek until official orders were opened. Don complied. Pyle's message (Tokyo) was right. The orders called for the first surface force attack upon the capital.

Don still has the lighter—and it's still working. The Zippo people featured the story in an ad that appeared in *Life*, May 19.

Incidental Intelligence

Item: Such subjects as "A Finite-Stage Model for Highly Asymmetric Residence-Time Distributions" will be discussed at an automatic control conference next month at the University of Colorado. If we were going, we wouldn't want to miss a session on the "Theory and Design of High-Order Bang-Bang Control Systems."

Item: Planning a new model is like lovemaking among elephants, say Chrysler Corp.'s Plymouth Div. engineers and designers. There is a lot of trumpeting; everything of significance transpires at a high level; and nothing comes of it for three years.

Item: Paspalum, the grass weed curse of Australian home gardeners, is creating a new industry, thanks to the U. S. Paspalum, used here as a fodder grass, doesn't propagate prolifically in America as it does in Australia where harvesters are earning $700,000 a year by exporting the seed.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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For Countless Uses of

SPRING STEEL

AMERICA'S LEADING SUPPLIER

Where

SERVICE and QUALITY

is the rule

WARD STEEL CO.

Boston—Cambridge, Mass.

Chicago, Ill.—Greensboro, N. C.

GRAB HOLD!

This sword is the symbol of the American Cancer Society. It is called the "Sword of Hope."

Grab hold! Every dollar you give brings new hope to cancer research. Fight cancer with a checkup and a check to CANCER, c/o your post office.

AMERICAN CANCER SOCIETY

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...Fluid Power NEWS

OILGEAR 40 Years of Fluid Power

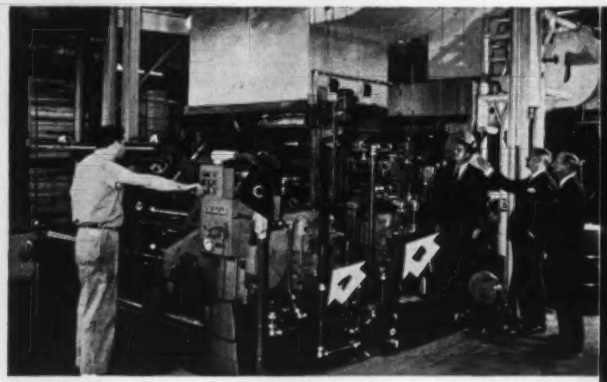
Report No. 11,806 From Oilgear *Application-Engineering* Files

HOW OILGEAR HEAVY-DUTY *Any-Speed HYTAC** DRIVE SYSTEMS ON *Anaconda's* NEW FOIL LAMINATING AND COATING MACHINES HELP SPEED PRODUCTION—CUT COSTS

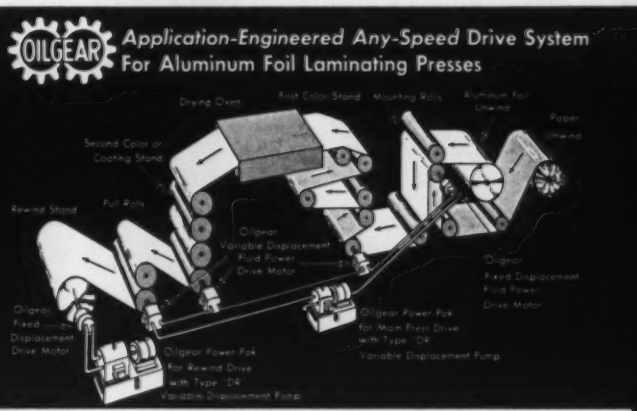
USER: *The Anaconda Aluminum Company, Louisville, Kentucky, Fair Lawn, New Jersey, Terre Haute, Indiana*
(Machine Builder — New Era Manufacturing Company, Hawthorne, New Jersey — successor to Meisel Press Manufacturing Company, Boston, Mass.)

PROBLEM: Main and Rewind Drive Systems for two, new, high-speed laminators to bond aluminum foil as thin as 0.0002″ to paper stock ranging from 15-lb tissue to 0.020″ carton and food board. In addition to laminating, these "presses" must simultaneously coat and/or color the foil.

REQUIREMENTS: 1. Accurate, wide range, dependable tension control to accommodate *Anaconda's* complete range of laminating foils and paper stock. 2. Infinitely variable, stepless speed range from 0 to 1000 fpm—capable of an optimum, continuous 850 fpm running speed. 3. Maintain tension accurately in "stall" condition indefinitely without overheating—and then pick up speed smoothly and quickly without snapping the sometimes fragile web. 4. Reduce costs through reduction of scrap, repair parts inventories, and machine downtime . . . operate at nearly three times former production speeds. 5. Must be: compact, to conserve valuable floor space; economical on electric power input; capable of continuous, three-shift operation.



ABOVE: One of Anaconda Aluminum's new, Oilgear-equipped, high-speed foil laminating and coating presses—rewind end—as installed at their Louisville, Kentucky, Laminating Plant. Roll cores—8¾″ dia. . . . web width—from 23″ to 52″ . . . roll diameters—to 60″ . . . roll weights—to 4500-lb. Tension range—from ½-lb/in. to 4-lb/in. depending on weight of lamination being processed. Arrows (A), (B)—Oilgear Variable Displacement Drive Pumps. Arrow (C)—one of two pushbutton control stations at opposite ends of the press—3 emergency "stop" buttons are located at other positions.


OILGEAR
Application-Engineered Any-Speed Drive System
For Aluminum Foil Laminating Presses
Drying Oven
First Color Stand
Mounting Rolls
Aluminum Foil Unwind
Paper Unwind
Second Color or Coating Stand
Rewind Stand
Pull Rolls
Oilgear Variable Displacement Fluid Power Drive Motor
Oilgear Fixed Displacement Fluid Power Drive Motor
Oilgear Fixed Displacement Drive Motor
Oilgear Power Pak for Rewind Drive with Type DR Variable Displacement Pump
Oilgear Power Pak for Main Press Drive with Type DR Variable Displacement Pump

Oilgear's patented *Any-Speed HYTAC** Drives (details not shown above) hold any preselected speed within ±0.1% under constant torque loads—within ±0.5% regardless of load, electric power variations, or temperature and viscosity changes . . . provide cushioned starting, remote jogging and threading . . . smooth, even let-off or build-up tensions . . . constant torque . . . adjustable tension . . . hydrodynamic braking. Applied to center shaft winders, *Any-Speed HYTAC** Drives automatically sense and compensate for changes in overall machine speed, and can automatically provide constant, adjustable, or tapering tension over a 20:1 winding range without dancer or follower rolls.

*HYTAC—A registered Oilgear Trademark for HYdraulic TAChometer Speed and/or Tension Control.

SOLUTION: Oilgear *Any-Speed HYTAC** Main and Rewind Drive and Tension Control Systems—as symbolized in the schematic sketch—above right. These compact, heavy-duty systems have successfully met or exceeded all originally specified requirements in continuous, three-shift, high-speed operation. Oilgear Drives were selected for these new machines because of: 1. The enviable record of maintenance-free long-life in several Anaconda Aluminum Plants. For example—six out of seven original, 300-fpm laminating presses at Louisville are Oilgear-equipped . . . two operating continuously since 1946. These 14-year-old drives—and two others—*have NEVER required maintenance other than oil changes and an occasional drive shaft seal.* The other two Oilgear Drives—installed in 1948—were disassembled three years ago merely for a preventive maintenance check—haven't been "touched" since. 2. Oilgear's accurate, dependable tension and speed control over a wide range—for smooth, precise, trouble-free operation on Anaconda's *entire range* of laminating stocks. 3. Space saving—Oilgear Drives occupy less floor space . . . do not require high-speed blowers for cooling—can hold stall-speed indefinitely without overheating. 4. Economy—in electrical power input, maintenance, virtually eliminate costly machine downtime and spare parts inventories . . . and in many cases—at lower installed cost.

Unbelievable?—Not to Oilgear Users! There are case histories upon case histories on file of machines equipped with *Application-Engineered Oilgear Drive Systems* that are rolling along—efficiently, quietly—with over 20 years of trouble- and maintenance-free service! Some additional *installation-proved* reasons . . . the greater accuracy, precision control of speeds, torques, tensions . . . new economies of operation, installation, and valuable floor space . . . are why more and more Oilgear users in the paper, printing and converting, food and beverage, marine, chemical, pharmaceutical, primary metals, metalworking, textile, rubber, military, and other industries all agree that . . .

for the lowest cost per year . . . it's OILGEAR!

For practical solutions to YOUR rotary or linear drive and control problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY
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1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN
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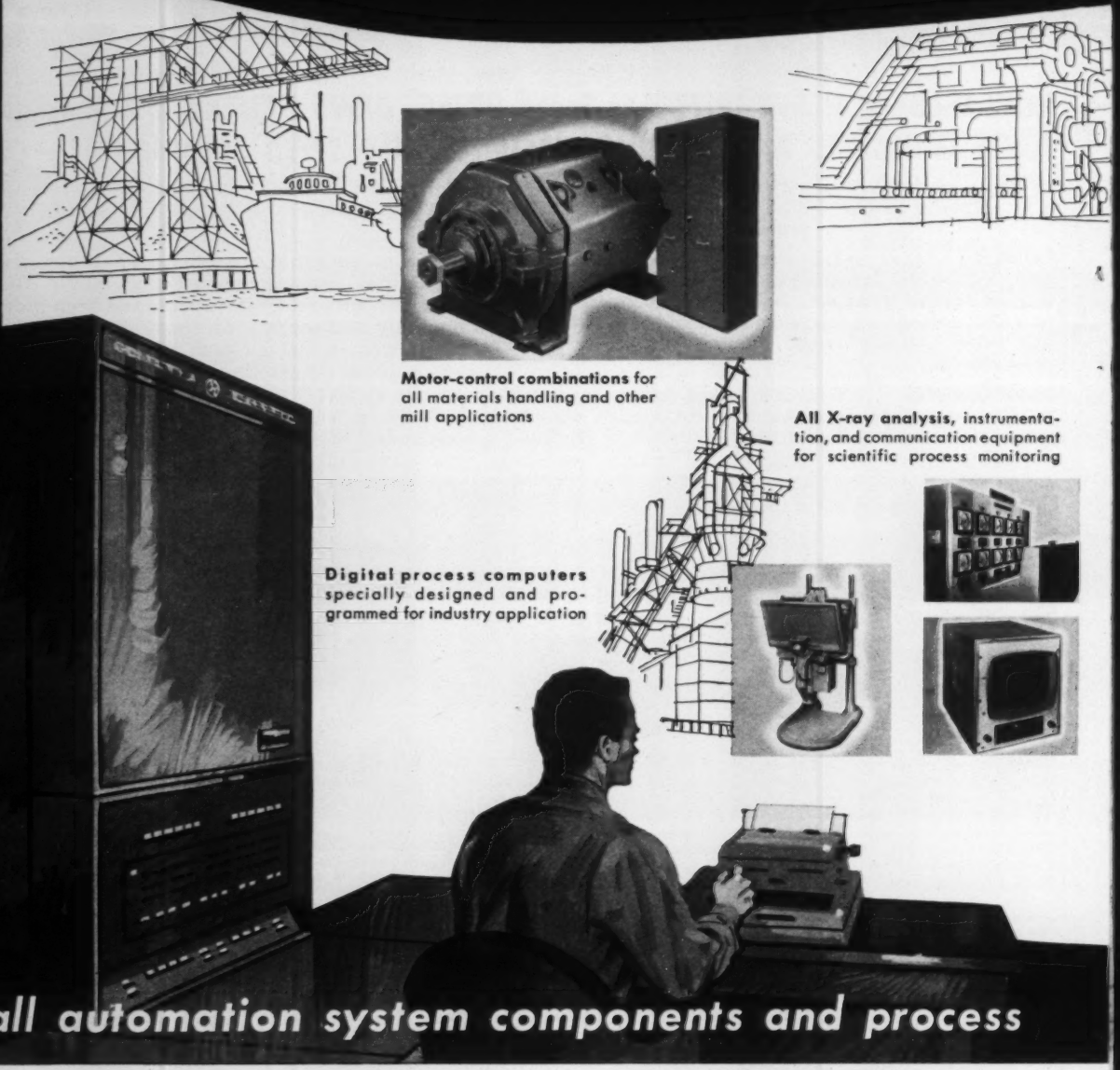
LEADERSHIP IN
INDUSTRIAL AUTOMATION



Motor-control combinations for all materials handling and other mill applications

All X-ray analysis, instrumentation, and communication equipment for scientific process monitoring

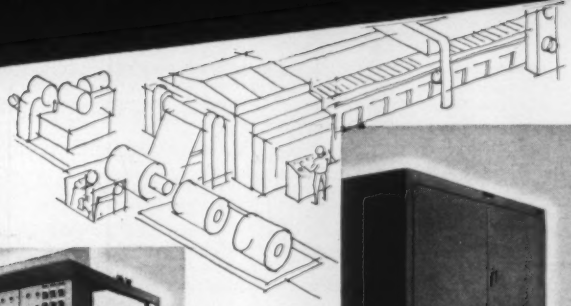
Digital process computers specially designed and programmed for industry application

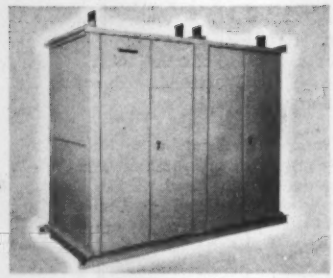
For all automation system components and process

your BEST SOURCE is ONE SOURCE....

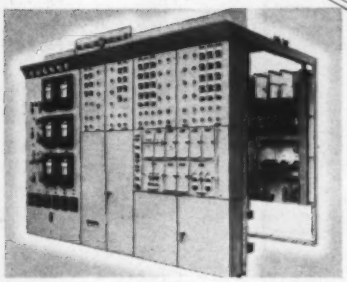
Whether your plans call for automation of one process or integrated automation of your whole business, a broad panorama of General Electric system components and process know-how provides you with the best single source of assurance that all automation goals will be realized. For, only a *one-source supplier* of all system components and engineering can assure you that all components have been designed to work together for maximum system efficiency and reliability.

General Electric is this one-source supplier. No other single source provides such a complete array of basic production system components such as motors, generators, and controls; along with all necessary instrumentation, sensing, data logging, and computing equipment—"the brains" of the automation system. And these components are proving themselves on-the-line, every day, in virtually every metal producing process from ore handling to finishing.

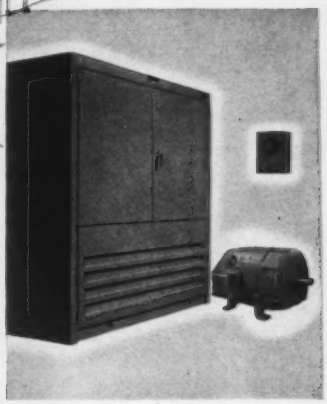




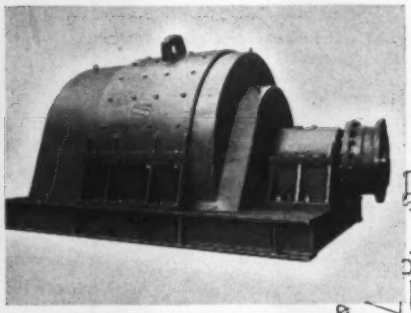
Rectifier power supplies or motor-generator sets for all mill d-c power requirements



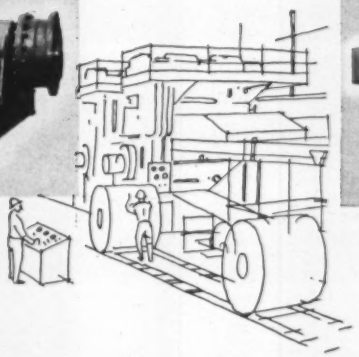
Controls for all main and auxiliary metal rolling mill and processing line applications

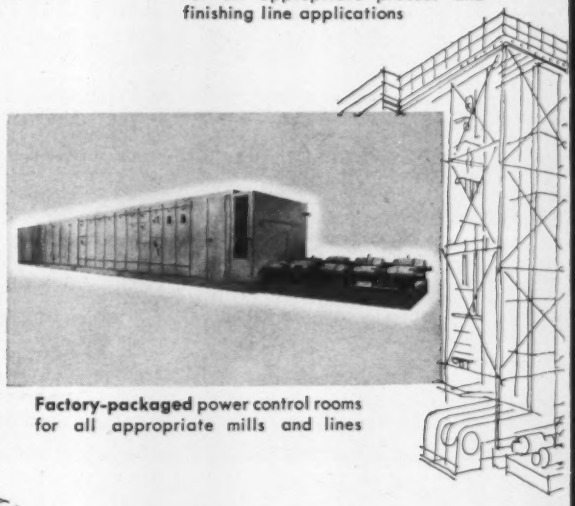


Packaged adjustable-speed drives for all appropriate process and finishing line applications



Large d-c motors for any main mill-drive application





Factory-packaged power control rooms for all appropriate mills and lines

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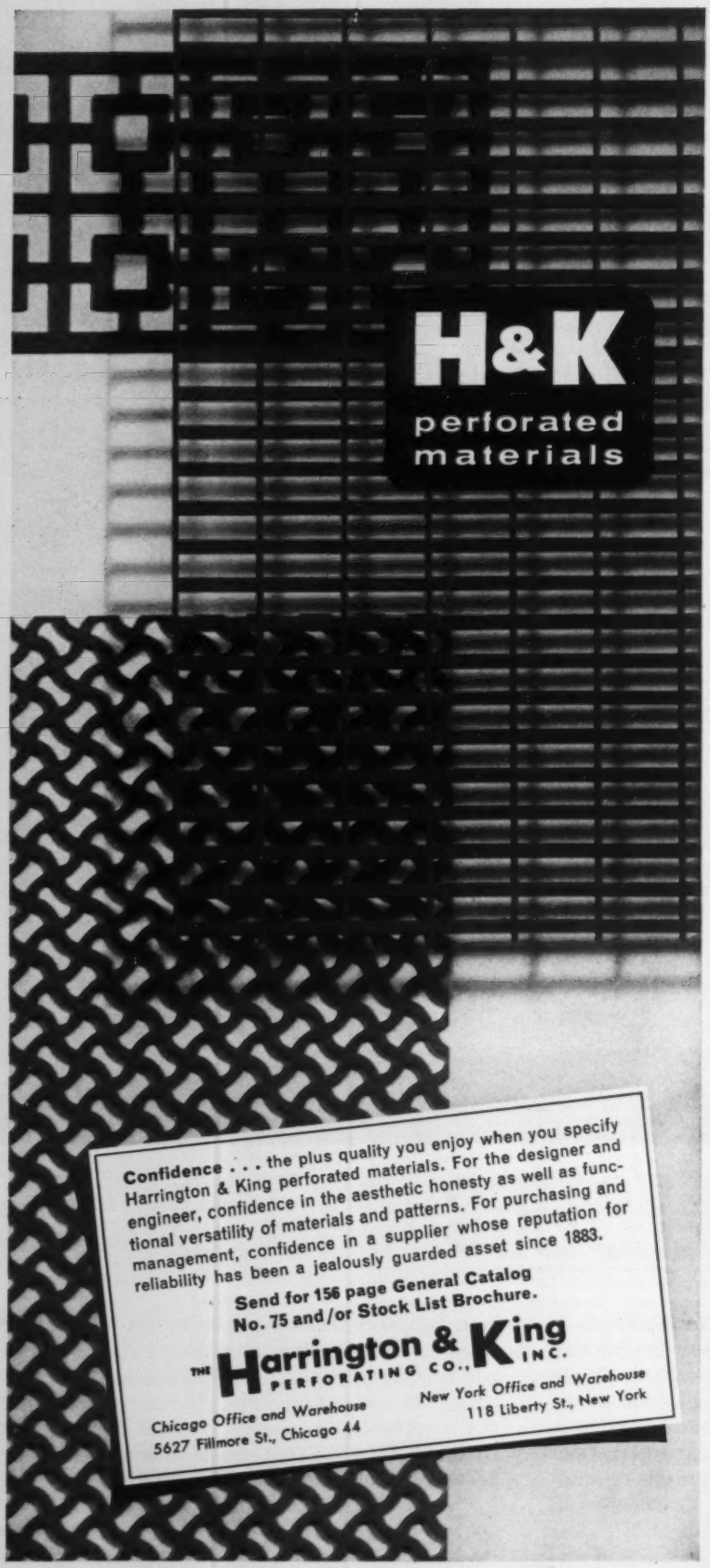
General Electric automation of these processes is developed according to *your* process needs. Our system engineers have, for years, worked closely with your industry to gain a thorough understanding of all processes, their interrelationships, and the inherent problems encountered in their automation. Thus you can be assured of an approach to automation that has, as its basis, sound knowledge and understanding of the *total* job to be done. No other single source can supply this much process know-how. It covers your entire production picture, from customer order to finished product. And it will pay you dividends, whether for automation of a single process or your entire plant. For complete information contact your nearest General Electric Sales Engineer or write to General Electric Company, Section 659-08, Schenectady 5, New York.

GENERAL ELECTRIC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Confidence . . . the plus quality you enjoy when you specify Harrington & King perforated materials. For the designer and engineer, confidence in the aesthetic honesty as well as functional versatility of materials and patterns. For purchasing and management, confidence in a supplier whose reputation for reliability has been a jealously guarded asset since 1883.
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118 Liberty St., New York

CALENDAR
OF MEETINGS

June 4-7, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association's address: 1 Thomas Circle N.W., Washington 5, D. C. Executive director: J. C. Sears.

June 4-7, National Association of Purchasing Agents: Annual meeting and exhibit, Conrad Hilton Hotel, Chicago. Association's address: 11 Park Place, New York 7, N. Y. Executive secretary: G. W. H. Ahl.

June 8-9, Malleable Founders Society: Annual meeting, The Broadmoor, Colorado Springs, Colo. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

June 11-14, American Society of Mechanical Engineers: Semiannual meeting, Statler Hilton Hotel, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

June 14-17, Drop Forging Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association's address: 55 Public Square, Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

June 18-20, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

June 19-21, American Marketing Association: Meeting and exhibit, Ambassador Hotel, Los Angeles. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive director: Vance E. Lockhart.

June 19-21, Material Handling Institute: Great Lakes Show, Cobo Hall, Detroit. Information: Shea Expositions Corp., 1 Gateway Center, Pittsburgh 22, Pa. President: L. West Shea.

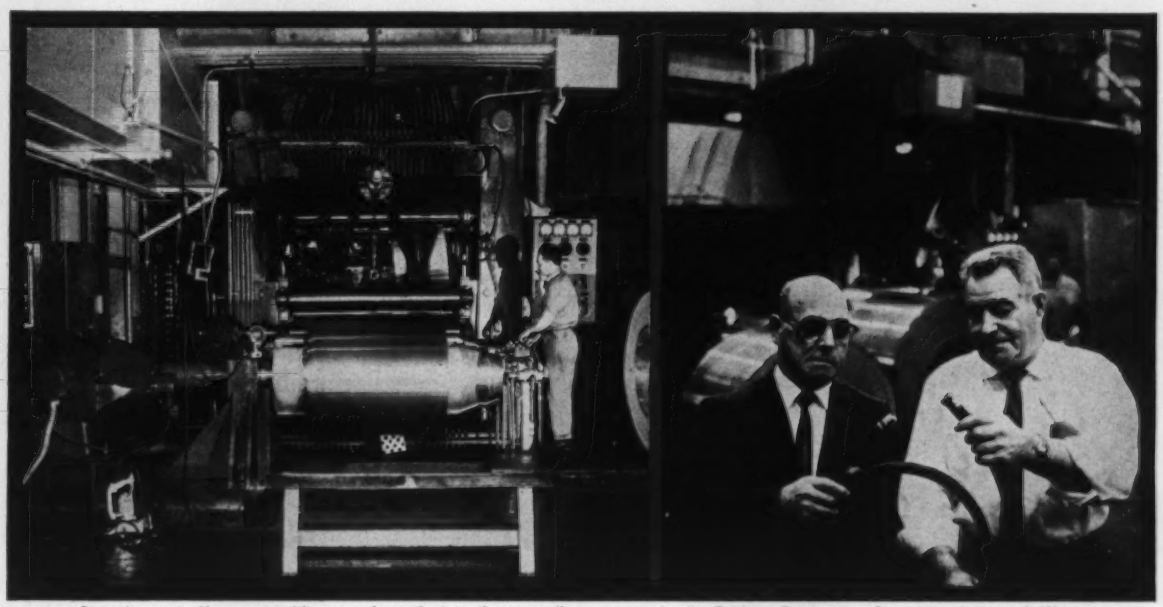
June 21, Electric Overhead Crane Institute: Meeting, Detroit Athletic Club, Detroit. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: J. H. Peritz.

June 22-23, Refractories Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

June 25-30, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Thomas A Marshall Jr.

Flexible Aeroquip Hose and Reusable Fittings Solve Routing Problem On Rolling Mill

... Reports The Dow Metal Products Company, Jackson, Michigan



Sixty Aeroquip Hose assemblies supply coolant to the top roll, another sixty to the bottom roll on this aluminum sheet rolling mill, at The Dow Metal Products Company.

Leslie Britton, Production Superintendent, and Warren Galapoo, Maintenance Superintendent, specified Aeroquip Hose and Reusable Fittings.

In processing aluminum roll stock, The Dow Metal Products Company, a Division of The Dow Chemical Company, reduces alloyed aluminum to as little as .006″ thickness. One hundred twenty Aeroquip 2556-10 Hose Assemblies, installed two years ago, solved routing problems in carrying pure mineral oil coolant to spray nozzles on this machine. Aeroquip Hose Lines are also specified throughout the entire plant to supply lube oil to bearings and carry high pressure hydraulic fluids.

Warren Galapoo, Maintenance Superintendent, states: "I don't know how we could solve certain problems if we didn't have flexible hose." Aeroquip Fittings help avoid downtime and reduce replacement costs because all fittings can be reused over and over again.

Let your Aeroquip Distributor, a fluid line specialist, help solve your hose and fittings problems. He is listed in the "Yellow Pages" under "Hose." Ask him for a copy of Industrial Catalog 205, or write us.

Bulk Aeroquip Hose can be cut to length and installed on the job without special tools. Fittings can be used again and again.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN
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AEROQUIP (CANADA) LTD., TORONTO 16, ONTARIO

WITH MAN IN SPACE

McDONNELL AIRCRAFT CORPORATION, Lambert Field, St. Louis, Missouri, is prime contractor for the Mercury Capsule, under the direction of the National Aeronautics and Space Administration. Photo shows capsule similar to the FREEDOM VII used in successful launch.

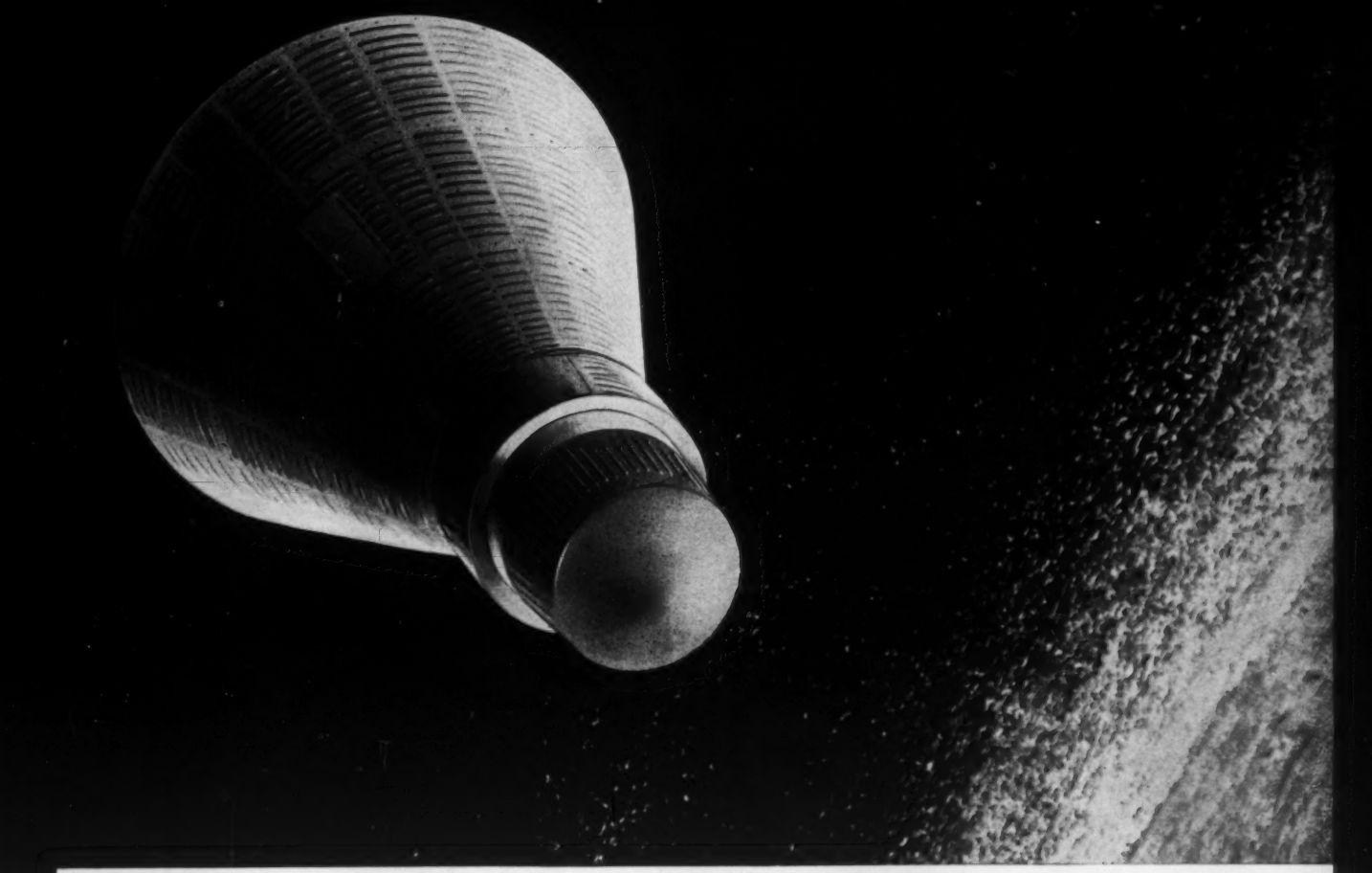
The time: May 5, 1961, 10:34 AM, EDT. *The man:* Commander Alan B. Shepard, Jr., USN, Astronaut. *The event:* launching of the Mercury Capsule with man on a down range step into space. *The metal:* titanium for a combination of strength and lightweight in the vehicle's double wall stringer construction.

A major supplier of commercially pure AMS4901 titanium in the Mercury Project, Republic Steel is the nation's *largest* producer of high-performance metals. Republic is a new source of a complete line of precipitation hardenable stainless steels . . . the only source of continuous rolled stainless sheet up to 60″ wide . . . the largest producer of stainless and alloy steels, and steels for cold extrusion.

To meet the challenge of space, Republic Steel is looking deep into the microstructure of steel . . . pulling facts from the heart of steel . . . aiming at fantastic new steels with tensile strengths even beyond 400,000 psi.

Republic's 3-Dimensional metallurgical teams—composed of mill, field, and laboratory metallurgists—help you select, apply, and process the most economical metals capable of meeting requirements. This is a confidential, obligation-free service. For additional information, contact your Republic representative or mail the coupon on the opposite page.

DESIGN ENGINEERS: Mail the coupon for a copy of Republic's new booklet, *Products For The Design Engineer.* Contains a useful Stainless Steel Selector Chart, and information on Republic High Strength Steels, Titanium, Electrical Steels, Vacuum Arc Melted Steels, and other high performance metals.



VACUUM ARC MELTED METALS . . .

Processed into billets, bars, plates and sheets, strip, or wire, Republic Vacuum Arc Melted Metals are produced in 4,000- to 20,000-pound ingots. The consumable electrode vacuum-melting process improves tensile strength, ductility, fatigue life, and performance at high and low temperatures. Precise control reduces nonmetallic inclusions and harmful gases. Republic helps you select the vacuum-melted metal best suited to requirements: constructional alloy steel, high strength alloy steel, bearing steel, stainless steel, super alloy steel, titanium, or special carbon steel.

REPUBLIC PH STAINLESS STEELS . . .

Republic PH 15-7 MO* for missiles and aircraft offers high ultimate tensile strength with excellent mechanical properties to 1000°F. Republic 17-4 PH* for shafts, gears, pins, and other components requires only a one-hour heat treatment at 900°F to develop its full strength (ultimate tensile strength to 200,000 psi). Republic 17-7 PH* for pressure tanks, bellows, springs, and other applications provides better corrosion resistance than the hardenable grades of chromium stainless. Send for PH Stainless Steel Booklet.

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I would also like more information on:
☐ Republic Titanium
☐ Vacuum Arc Melted Metals
☐ Republic PH Stainless Steels

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REDUCE UNIT COSTS IN PRODUCTION OPERATIONS...

New Mobilmet

Whether yours is a production or job-shop operation, you can benefit from new Mobilmet oils because they assure superior tool life, excellent finishes and reduced staining in the machining of an unusually wide range of metals.

Mobil

- **In production operations** this means reduced unit costs. And by using fewer cutting oils, you save through quantity purchases and handling.
- **In job-shop operations** this means greater profits per piece. And, you reduce machine downtime for draining, changing, or blending cutting oils.

The reason for the unique versatility of Mobilmet oils is a new additive combination, developed and patented by Mobil, which is pressure-temperature selective in its activity—highly effective over the wide ranges of cutting pressures and temperatures produced in machining various metals with greatly different physical characteristics. As a result, a single Mobilmet oil is useful for both tough, draggy metals and hard, brittle metals.

Check the benefits new Mobilmet oils offer you. For complete information mail the coupon at right. Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

INCREASE PROFIT PER PIECE IN JOB SHOP OPERATIONS...

Oils *multi-metal cutting fluids with unique pressure-temperature selective additive composition*

MOBILMET OILS OFFER YOU!

1 *Greater machine output*

- A. More pieces per hour through increased feeds or speeds
- B. Reduced time-out for tool changes

2 *Lower tool costs*

- A. Fewer tool grinds
- B. Less metal removed per tool grind

3 *Reduced loss from rejects*

- A. Dimensional tolerances maintained
- B. Surface finish improved . . . with possible elimination of additional finishing operation

4 *Simplification of cutting oil requirements*

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A Division of Socony Mobil Oil Company, Inc.
150 East 42nd Street, New York 17, N. Y.

Gentlemen: I am interested in learning how new Mobilmet oils can help in my metalworking operation. Please provide further information.

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*Position*_____

*Company*_____

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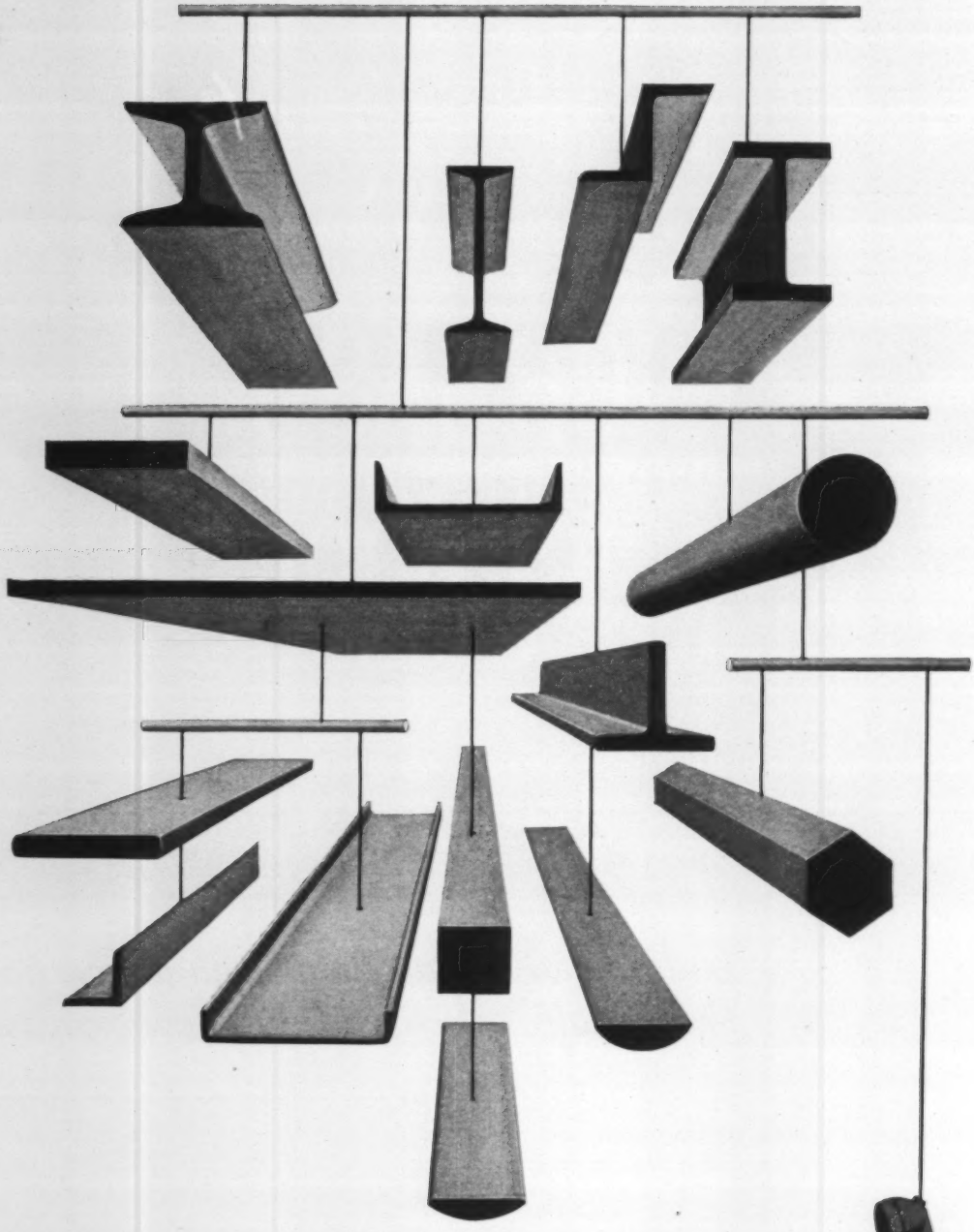
*City*_____ *Zone*____ *State*_____

*(Check one): Job Shop*____ *Production*____ *Combination*____



Call any one of 20 Ryerson service centers for bars, shapes, structurals and plates. No one comes close to equaling Ryerson stocks of hot rolled carbon steels in shapes, sizes and tons. And no one equals Ryerson quality controls and cutting accuracy. So be Metalogical—call Ryerson.

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METALOGICS

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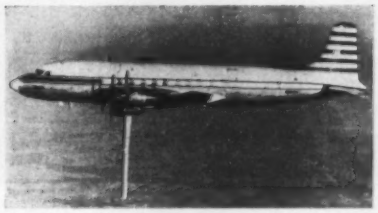
Westinghouse Tries 'Flying TV' for Education



Educational television took to the air on May 15, when a DC-6 equipped with Westinghouse Electric Corp.'s Stratovision, an airborne TV system, transmitted educational broadcasts to students in six states. Westinghouse says Stratovision broadcasts 175 to 200 miles in all directions; 5 million students could be reached from one airplane.

Machine Tool Orders Fall Back

March was a good order month for the machine tool industry, but as predicted by STEEL (May 8, p. 75), April didn't maintain the pace. The National Machine Tool Builders' Association reports that new orders for metal cutting machines in April equaled $41.55 million (vs. $54.65 million in March). Orders for forming type machines dropped too—from $14.9 million in March to $6.35 million in April.

'We Sell Steel' Theme Jumps Auto Sales 57 Per Cent

Auto dealers in Middletown, Ohio, gave their community an opportunity to lick its economic problems. During a three week "We Sell Steel" campaign they boosted their sales 57 per cent over the previous 14 week average because the people of Armco Steel Corp.'s home town accepted the theme that "selling steel means better times for everyone."

Odds (Today) Favor Peaceful Auto Labor Settlement

As things now stack up, the United Auto Workers and the automakers will settle their contract negotiations peacefully. Cost of the package: Something less than the 8 to 10 cents per hour per year (two year contract) forecast by AFL-CIO economists. But the talks could bog down on several key issues (see Page 37).

Du Pont Must Surrender GM Stock

The Supreme Court has ruled that Du Pont must totally divest itself of its 63 million shares of stock in General Motors Corp. The vote was 4 to 3, with

two justices taking no part in the case. Divestiture is to commence within 90 days and be completed within ten years. Du Pont has 60 days to file its divestiture proposals. The three dissenting justices felt that the ruling of the lower court, which ordered Du Pont to surrender voting rights but not stock ownership, was sufficient. The new decision can be expected to revive proposals for new federal laws to ease the burden on stockholders affected by such rulings.

Bell Will Use Sapphires to Protect Communication Satellites

Satellites like the models in the photo (to house communication equipment) will be protected by manmade sapphires, Dr. James B. Fisk, president, Bell Telephone Laboratories, reported in his Charles M. Schwab Memorial Lecture at the American Iron & Steel Institute meeting (see Page 42). The sapphires will protect solar cells from space radiation, enabling telephone satellites to endure the rigors of space for ten years or more, Dr. Fisk said. The sapphire slices will be brazed to platinum sidebars and soldered to a ceramic base.

STEEL Goes International

Beginning in January, 1962, STEEL will publish a monthly, international edition to serve U. S. firms doing business abroad. The international edition will be selectively distributed in Western Europe, Japan, Australia, India, Africa, Central, and South America. STEEL's co-publishers, Walter J. Campbell, editor, and Sal F. Marino, business manager, will have the same titles and responsibilities for the overseas edition.

U. S. Steel Caters to Highway Market

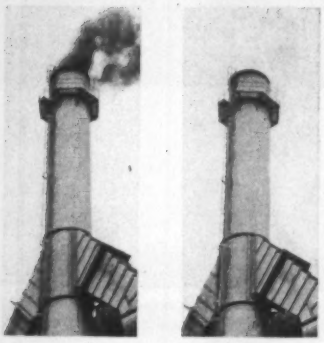
U. S. Steel Corp. has launched a new design and engineering program to help makers of highway hardware find new and better ways to use steel. The prototypes in the photo are examples. They're displayed by Wilbur Smith (left), design consultant, and Robert C. Myers, director of U. S. Steel's market development division. As part of the program, U. S. Steel is offering a "highway hardware technical notebook" to metal fabricators. It contains engineering data and designs for a wide variety of highway hardware.

Westinghouse Sets Up Antitrust 'Board of Advice'

Westinghouse Electric Corp. has established a "board of advice" to help the firm meet antitrust requirements. Mark W. Cresap Jr., president, said the board "will review corporate policies and enforcement procedures, counsel on steps we have taken and suggest any further steps . . . and generally expose itself to the problems of a major corporation as they relate to its deter-

mination to abide by the laws governing marketing and pricing." The board members are Dean Erwin N. Griswold of Harvard Law School, Dean Eugene Rostow of Yale Law School, Prof. S. C. Oppenheim of Michigan Law School, and Dr. A. D. H. Kaplan of the Brookings Institution. Mr. Cresap also urged employees to avoid association meetings held in resort areas.

J&L Installs Precipitators on Open Hearths



Now you see it, now you don't. That's what happened to open hearth smoke at Jones & Laughlin Steel Corp.'s Cleveland Works when eight electrostatic precipitators went into action May 17. They operate at 98.5 per cent efficiency, cleaning gases from three, 220 ton, oxygen lanced furnaces. Two, 200 ton, basic oxygen furnaces, scheduled for completion this summer, will be tied into the control system. In five years, J&L has spent nearly $10 million for smoke control devices at the Cleveland Works.

USW Presses for Shorter Workweek

The Executive Board of the United Steelworkers of America has published this statement: "We will continue to press for, and focus attention on, the need for serious consideration of a shorter workweek, not only by Congressional action but also in the sphere of collective bargaining."

Ford Hints It'll Market Electric Vehicle

Sometime in the coming decade, if all goes well, Ford Motor Co. will market an electric, levitation type vehicle. It may be heated and cooled thermoelectrically. The outer shell will be transparent, will control the amount of solar radiation that enters the vehicle, and may—through solar cells—put the sun's energy to work. Steels twice as strong as those now used would be fabricated into structural parts for the vehicle.

Plasma Arcs Set for Full Production Role

In the photo, Linde's Plasmarc cuts ferrous and nonferrous metals at speeds up to 1000 in. per minute. Plasma arcs are also getting more play for joining, plating, and surfacing of practically anything that melts without decomposing (see Page 70). Recent work has made it possible to cut stainless 5 in. thick. And in surfacing, diffusion can be controlled at high speeds.

Advice for Exporters

"To keep up the present export drive, some U. S. companies, among them pretty large ones, will have to set for themselves a more clearly delineated foreign trade philosophy and a clearcut international business policy," asserts S. J. Rundt, New York consultant on international business. He says

STEEL The Metalworking Weekly

May 29, 1961 Vol. 148 No. 22

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29 W. 39th St., New York 18, N. Y.

the creation of special reserve funds, toward the day of losses abroad, has become all but mandatory. And he points out that "the study of political risks and generally better business intelligence have become *sine qua non* for U. S. companies."

Steel May Be No. 1 Market for Uranium

Research on peacetime uses of uranium indicates that the steel industry offers the greatest potential as a nonnuclear market for Canadian producers, William A. Gilchrist, president, Eldorado Mining & Refining Ltd., says. Many field tests are underway to check the performance of uranium steel in such items as railroad axles, heavy chain, oil drilling equipment, and marine hardware.

Space Market to Grow Faster than Electronics, Says GE

The growth of the space market in the 1960s will double the skyrocketing growth of the electronics market of the 1950s, contends A. W. Robinson, manager-space business development for General Electric Co.'s Missile & Space Vehicle Dept. He says the space market will soar from $1 billion in 1960 to $8 billion annually by 1970. The electronics market grew at a 4 to 1 rate during the last decade. He said the principal forces behind the space growth are "government foresight, business courage, and engineering imagination."

Straws in the Wind

The Senate Armed Services Committee has voted to continue production of B-52 and B-58 bombers and has added $525 million to the President's budget for that purpose . . . The Thyssen Steel Group of West Germany reports that gross sales during the first half (September to March) of its current fiscal year rose 9 per cent to $314 million; crude steel output rose 7 per cent . . . Brig. Gen. Don Flickinger, head of the Air Force's life sciences program, says the U. S. will probably need 3½ to 4 years to duplicate Gagarin's accomplishment . . . The metal producing industries operated at 61 per cent of capacity during April vs. 57 per cent in March . . . Bookings of industrial material handling equipment in March rose 19.7 per cent above those of February, reports Material Handling Institute Inc.

Metalworking Pulse

The Business Trend: STEEL's index of industrial production continued the climb begun in March. It was up another point, remaining but 1 point under the year-ago pace for the second consecutive week. **Autos:** Output showed little change last week. It should hold steady for the week ended May 27. **Steel:** Tonnage is higher than in the corresponding period of 1960 and the gap is expected to keep widening at least through the July 4th holiday week.

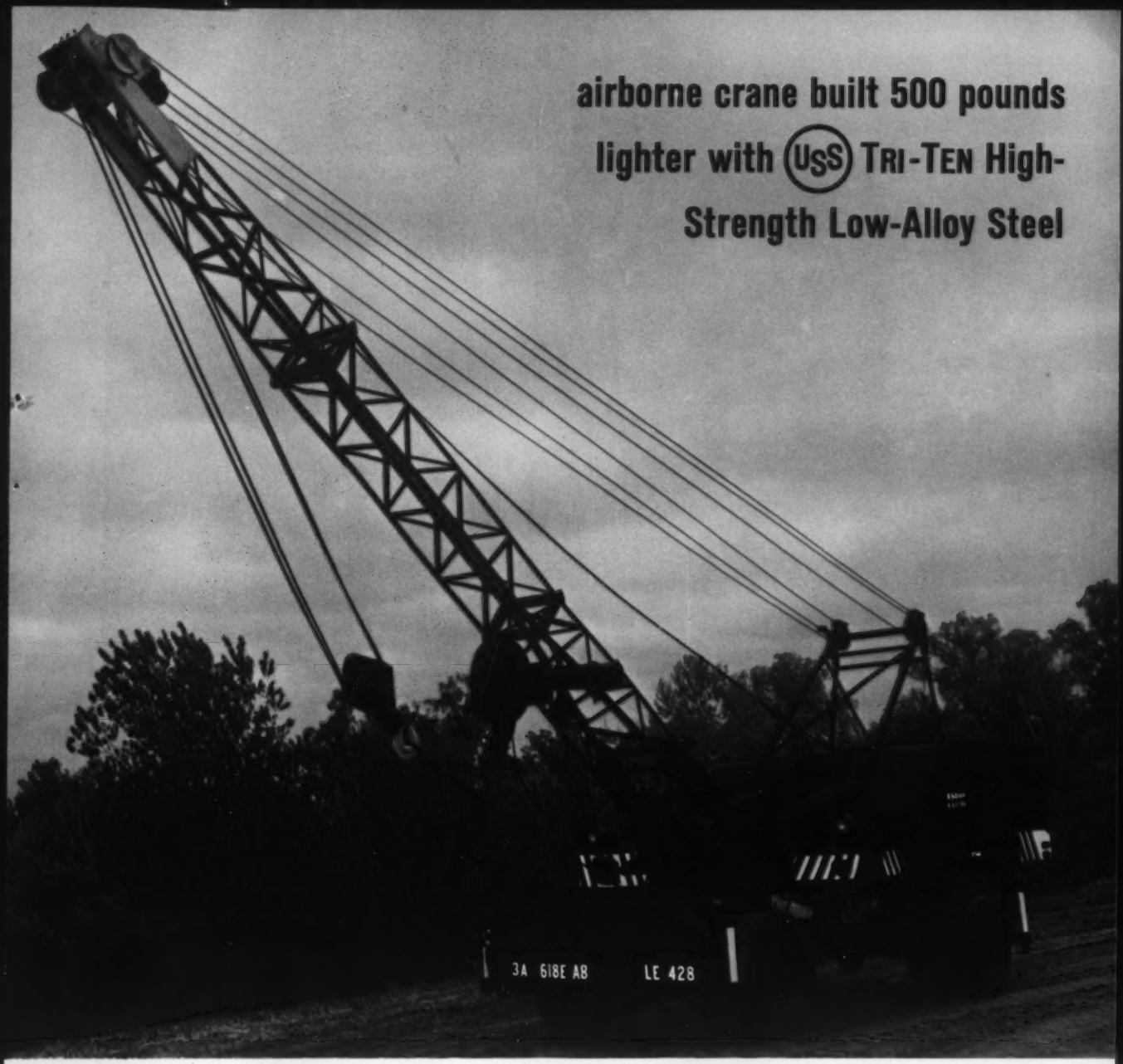
- **INDUSTRIAL PRODUCTION INDEX** (1947-49=100)
  Week ended May 20 . . . 162†
  Year ago 163
  Details on Page 57

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended May 27 . 128,000*
  Year ago 142,359
  Details on Page 54

- **STEEL INGOT OUTPUT (TONS)**
  Week ended May 27 2,080,000*
  Week ago 2,037,000
  Details on Page 101

†Preliminary. *Estimated.

airborne crane built 500 pounds lighter with USS TRI-TEN High-Strength Low-Alloy Steel



Lightweight crane built strong with USS TRI-TEN High-Strength Low-Alloy Steel. Designed for the U.S. Army Corps of Engineers, Ft. Belvoir, Virginia. Builder: Koehring Co., Milwaukee, Wisconsin.

This air transportable, air droppable U.S. Army crane had to be strong enough to lift 7 tons but light enough to be parachuted into a combat area. The Koehring Company of Milwaukee, Wisconsin, solved the problem with USS TRI-TEN High-Strength Low-Alloy Steel.

By using USS TRI-TEN Steel in the turntable, the lower works of the cruiser, and the boom, Koehring designers used only two tons of steel . . . with a clear saving of 500 pounds. Strength was not sacrificed because USS TRI-TEN Steel has a minimum yield point of 50,000 psi.

USS TRI-TEN Steel is well known as one of the most weldable and toughest high-strength low-alloy steels in the industry. Its superior notch toughness at low temperature makes it ideal for all-weather mobile equipment. TRI-TEN Steel has excellent weldability, good resistance to abrasion, and high atmospheric-corrosion resistance.

For other military vehicles, United States Steel makes extremely tough, rolled alloy armor plate, in addition to a complete line of high strength steels, "T-1" Constructional Alloy Steel, Stainless Steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1" and TRI-TEN are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

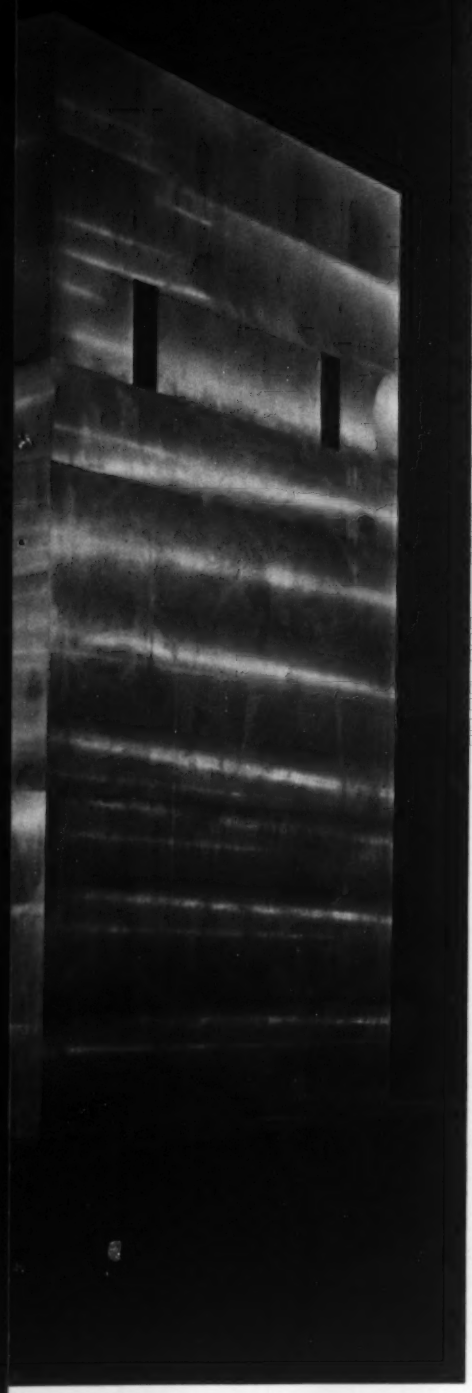
This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Inspector measuring pole face gap to a tolerance of ±.005".

Yoke made of five forgings held together with dowels loaded to 350,000 pounds tension by a hydraulic bolt stretcher.

This mark tells you a product is made of modern, dependable Steel



259-ton magnet forgings for new 10^{15} (million billion) particles/second cyclotron

This 88-inch spiral ridge design cyclotron will permit nuclear explorations which heretofore have not been possible. The spiral ridges produce greater phase stability, prevent waste of energy. They keep the particles in focus at the tremendous speeds that are built up.

The beam current (number of particles accelerated in a given time) will be about double that of one world-famous 60-inch cyclotron and about 1,000 times that of the 184-inch synchro-cyclotron. Some million billion particles a second will be controlled by the intense, precision magnetic field created by this electromagnet.

The new machine will accelerate a variety of particles. Alpha particles (the nuclei of helium atoms) will reach a maximum of 120 million electron volts (MEV); deuterons (the nuclei of heavy hydrogen atoms) 60 MEV; and protons (the nuclei of ordinary hydrogen atoms) 30 MEV.

To meet the stability and precision requirements, designers turned to forgings. The USS Quality Forgings seen in the pictures represent about 305 tons of parts that were forged on our 10,000-ton press. After extremely accurate machining the total assembly weighed 258.8 tons.

To match magnetic properties, the pole pieces had to be from the same heat of low carbon steel, and they had to be machined, ground and polished to ±.005″. The pole faces had to be parallel to within ±.005″ over their entire surfaces. Steel for all 18 forgings was melted, forged, machined, heat treated and inspected at our Homestead Works. We also furnished dowels 3½″ in diameter, hardened to Rockwell C 35 to 40, which were loaded to 350,000-pounds tension when the forgings were fastened together.

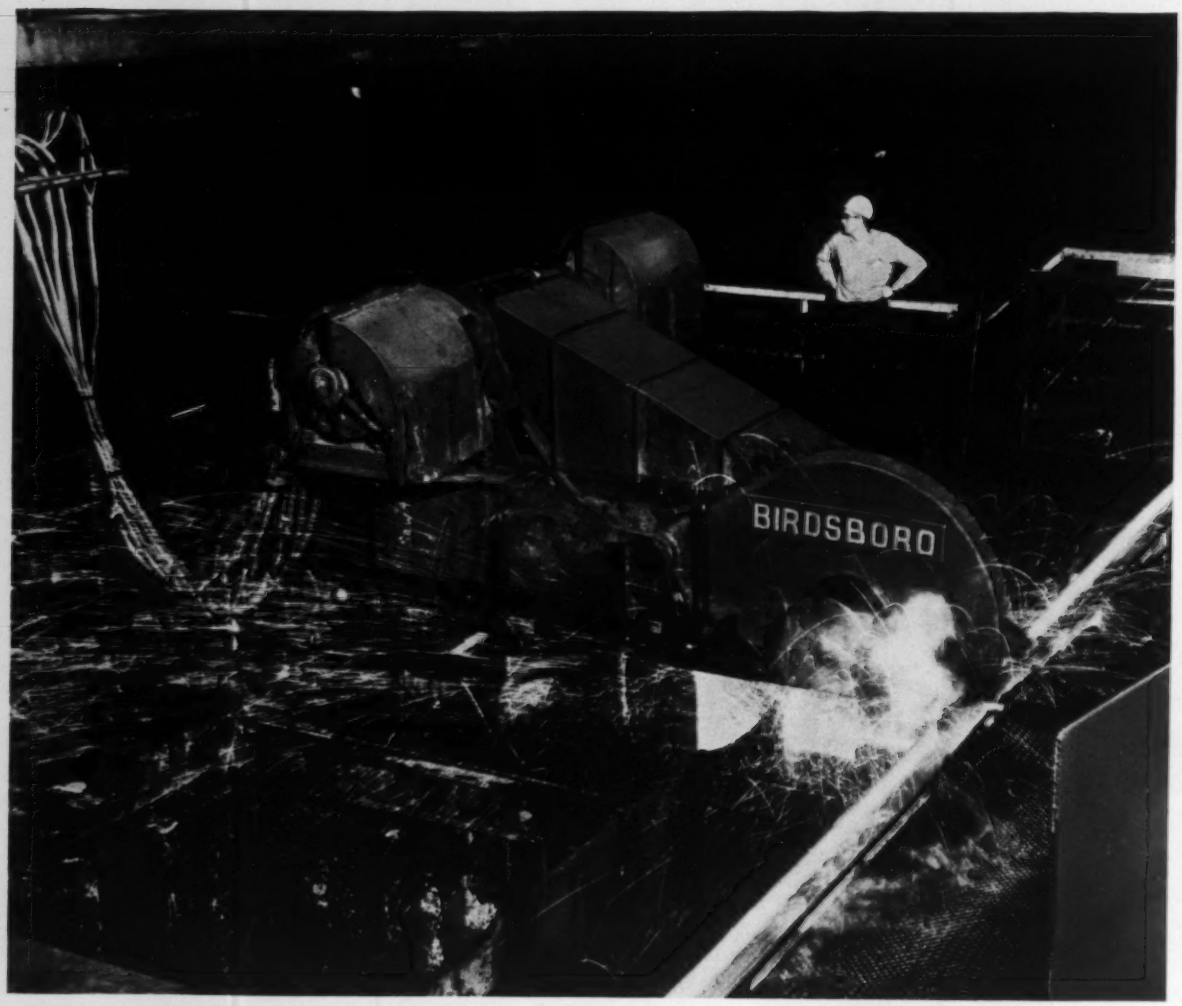
No matter what kind or size of USS Quality Forgings you buy, you get the advantages of the finest steel, the most modern equipment and the most skilled forging men in the world. Please address inquiries for our free folder on nuclear forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal & Iron Division • United States Steel Export Company

USS TRADEMARK

United States Steel

It takes only 420 seconds to change blades on this **BIRDSBORO** Hot Saw



- Dynamic braking brings the whirring blade of this Birdsboro hot saw to a complete stop in 35 seconds. Removal and replacement take 385 more. Then it's back in operation again . . . with only a fleeting production interruption for its owner, Inland Steel.

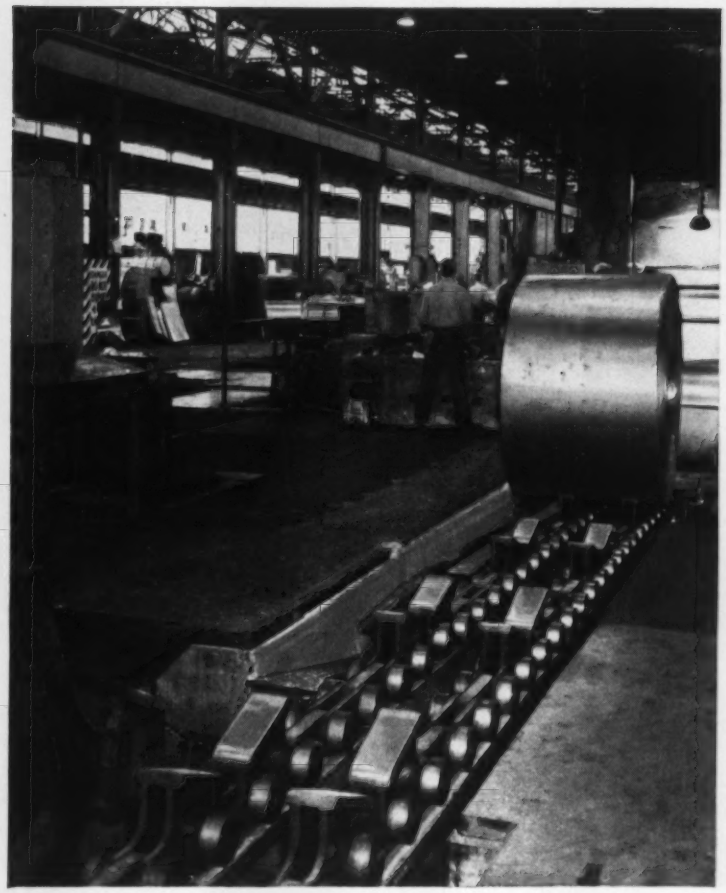
Inland has two of these 68" Birdsboro hot saws. They are designed to cut rounds and squares, as well as wide flange beams—in lengths from 10′ to 75′, at temperatures from 1300°F to 1800°F.

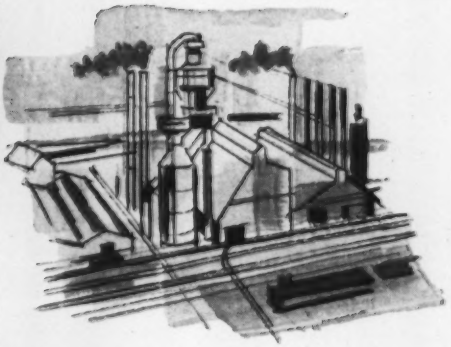
Improving engineering features like this is a specialty of Birdsboro. Our design engineers are ready to begin on *your* next job. Write: *Sales Department, Engineering Department & Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM92-60

BIRDSBORO
CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL





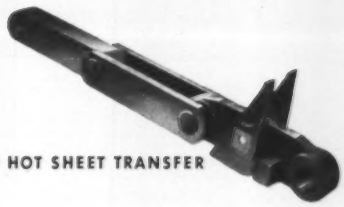
get steel mill toughness

in Jeffrey chains

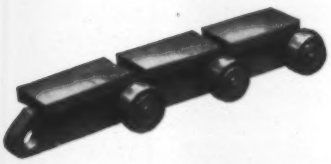
Starting right with selection of metals to give maximum strength with minimum weight, Jeffrey builds durability into steel mill chains. They are designed for continuous operation. Machining, heat treatment, assembly and inspection are rigidly controlled to Jeffrey's high standards.

You can select Jeffrey chain and attachments for every steel mill requirement or have them tailor-made to fit the job. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

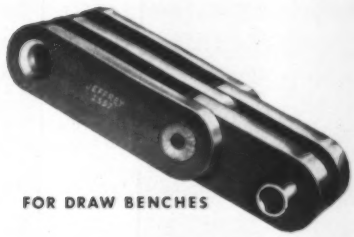
FOR CROP CONVEYORS



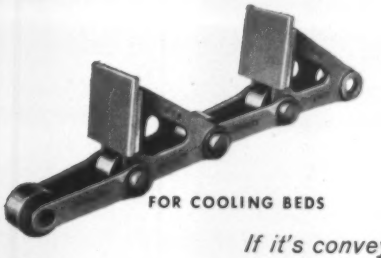
FOR HOT SHEET TRANSFER



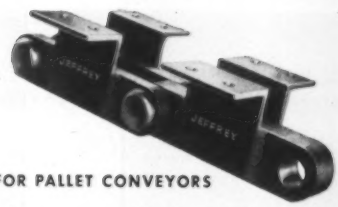
FOR HOT COIL CONVEYORS



FOR DRAW BENCHES



FOR COOLING BEDS



FOR PALLET CONVEYORS

JEFFREY

If it's conveyed, processed or mined, it's a job for Jeffrey.

SERVICE

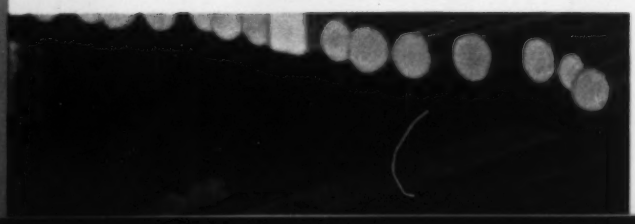
get Youngstown steel quality plus cost-cutting service and delivery from your nearby Steel Service Center

Depend on Youngstown for quality steel. And get fast, sure delivery of Youngstown steel from your Steel Service Center. Steel in a day. Steel in hours. Steel in the variety and amount you need. Youngstown steel in plate, bar and sheet. Leaded steels, alloy steels, Yoloy steels, tin plate—hot rolled, cold rolled and galvanized sheet. All quality steels from Youngstown, a major supplier to America's *independent* Steel Service Centers.

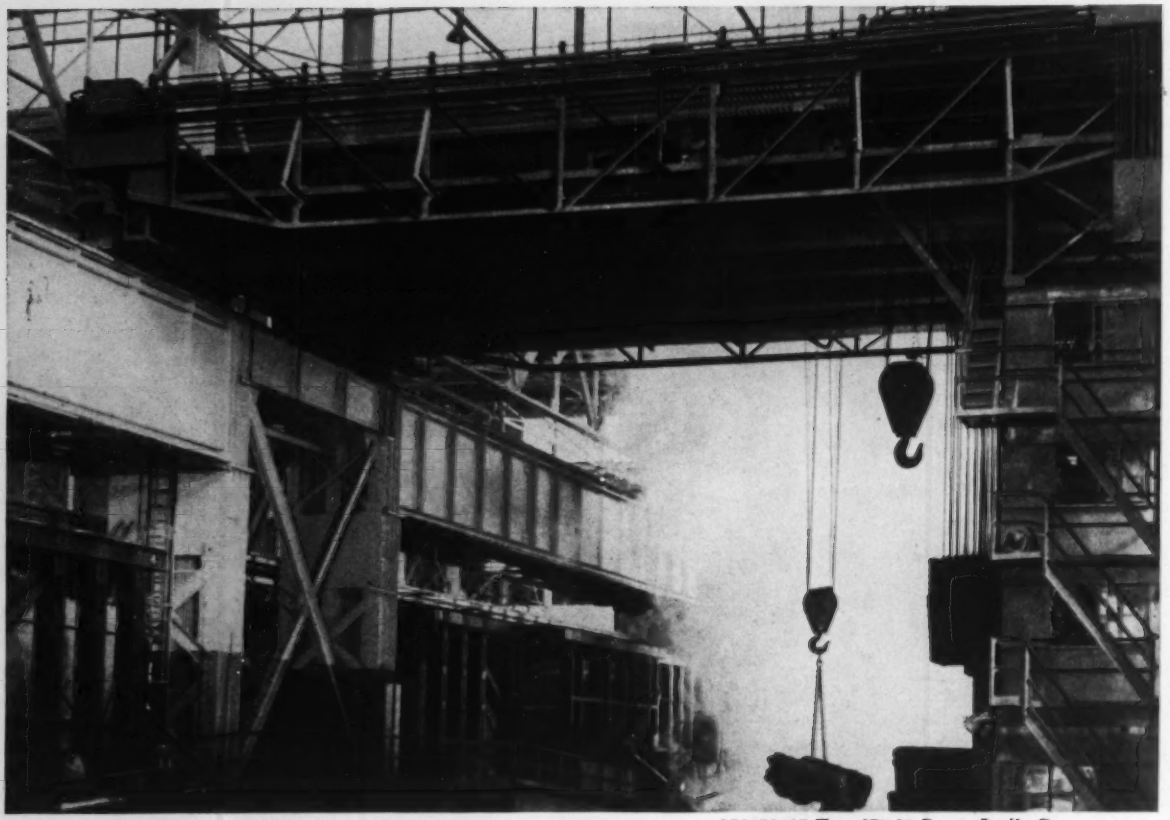
Besides steel, you get service from your *independent* Steel Service Center. Technical advice. Order help. Fabrication—cutting, slitting, leveling, heat treating, testing, grinding. And more.

Steel to help you make better products. Stocks to reduce your inventory. Service to help you cut costs. Count on it. Steel from Youngstown. Service from your *independent* Steel Service Center.

Youngstown – growing force in steel



For information about all Youngstown Steel Products, write: Dept. 25-H,
The Youngstown Sheet and Tube Company, Youngstown, Ohio



250/50/15 Ton, 67'-0" Span, Ladle Crane

At Kaiser's Fontana Works...

METAL IS KEPT MOVING WITH MORGAN CRANES

Highly efficient, dependable Morgan cranes help keep production moving smoothly at Kaiser Steel Corporation's Fontana, California, works.

In making plans for mill modernization or expansion, put a Morgan Engineering representative on your planning team. He'll give you facts on Morgan cranes and other Morgan mill equipment that will assist in speeding production and lowering your costs.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

E.O.C.I. MEMBER

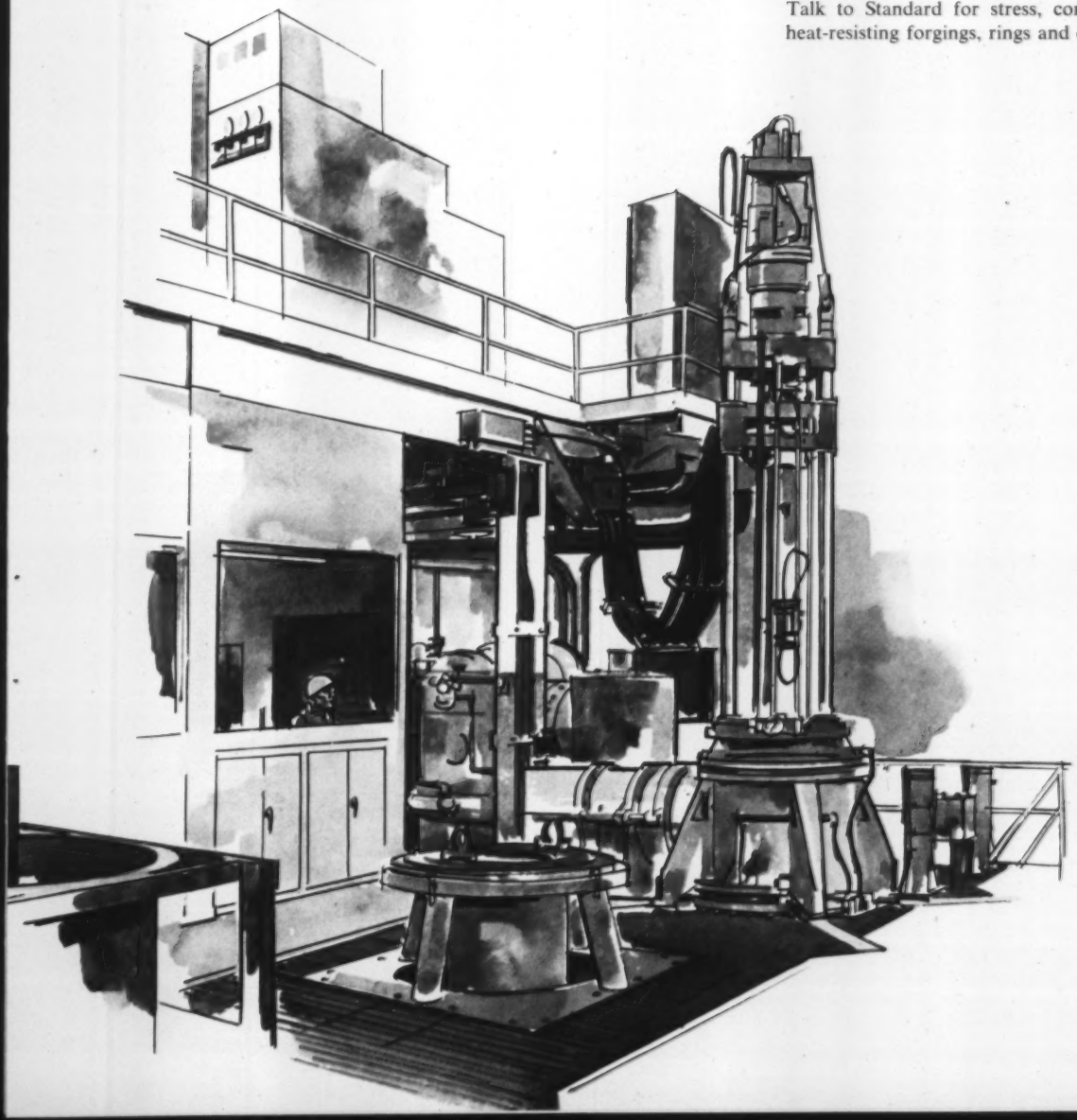
Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws, auxiliary equipment and welded fabrications.

EXOTIC STEELS FROM STANDARD

The vacuum arc remelt furnace pictured below is producing some of the largest ingots of the most advanced alloys in commercial production today—superstrength alloys for missiles, such as D-6, AMS-6428, 300M, and special high-temperature alloys for gas turbine, jet engine applications, A286, Waspalloy—to name a few.

This facility rounds out the most modern integrated steelmaking plant for special alloy forgings and rolled rings in the country—electric furnace steels, vacuum degassed, and vacuum remelted.

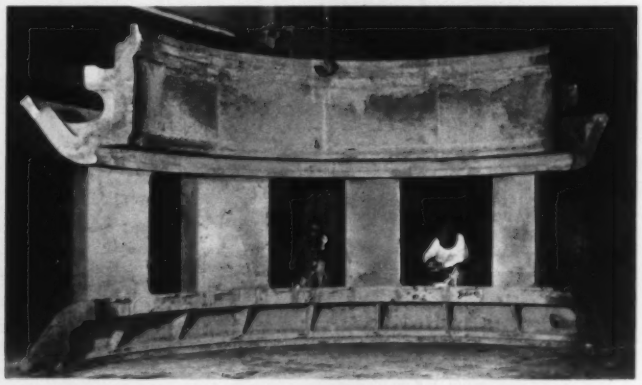
Talk to Standard for stress, corrosion and heat-resisting forgings, rings and castings.



QUALITY CONTROL IS SECOND TO NONE AT STANDARD. Quality control at Standard is maintained by the most accurate, up-to-date testing equipment available. Laboratory facilities operate day and night to support our metallurgists, shop foremen, mill and machine operators—as well as plant management and, of course, our customers.

STANDARD'S OPEN-DIE FORGINGS SUPPLY NATION'S LEADING INDUSTRIES. Steel and nonferrous alloys can be worked in Standard's forge shop, including some hard-to-work metals such as titanium and super alloys. It can turn out forgings from 15 to 52,000 lb.; up to 45 inches in diameter; and up to 60 ft. in length. Major products include rotors and wheels for turbines, propeller shafts for ships, rolls for sugar, printing and rubber industries.

Standard's hundreds of customers represent every major industry in the world. Metal components of carbon and alloy steels, super alloys, and nonferrous alloys such as aluminum and titanium are supplied by Standard for an endless line of products. What particularly impresses our customers however, is the unique, personalized service we provide. See for yourself—bring your next problem to Standard.



STEEL CASTINGS TO VIRTUALLY ANY SPECIFICATIONS. The Standard foundry, one of the larger ones in the country, has turned out castings as light as 1 lb., and ranging up to 85,000 lb. They include some of the largest heads ever cast for dredge cutters and also vital components in huge hydroelectric projects throughout the world. Standard yields to none in the skill of its foundry engineers, metallurgists, molders, coremakers and core setters.

PIONEERS IN ROLL-FORGED RINGS . . . STANDARD. Standard's craftsmanship in forming metal rings for heavy industry dates back to 1856. The first all-forged weldless rings were produced in volume for the first time in 1870—at Standard. And much of the development work in forging weldless rings of high-alloy steels, aluminum and titanium has been done in Standard's Ring Department.

Standard Steel Works Division

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BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

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Printed in U.S.A.

MI-61-1

Don't blindfold him!

THE MAN in this picture is a cancer research scientist. The device he is using looks like something out of science fiction—but actually, it's an electron microscope. It shows the sub-microscopic detail of a cancer cell—magnified 100,000 times. *The cost of one electron microscope is $35,000.*

Some of the equipment needed for cancer research is even more expensive.

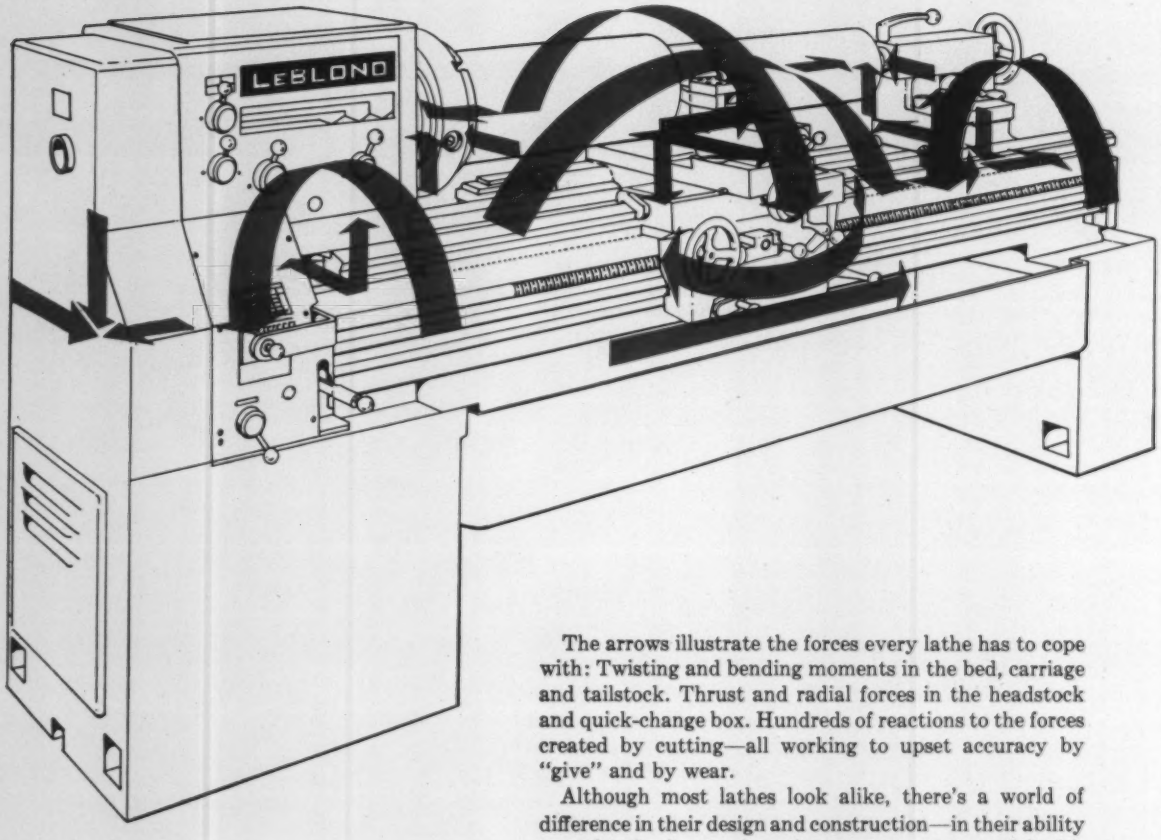
Today, in research centers throughout the country, 1300 scientists, supported by American Cancer Society funds, are at work searching for the cause of cancer—and, ultimately, ways to prevent it.

The American Cancer Society grants millions of dollars for research on such projects as the study of viruses as a possible cause of cancer—the development of hormone treatments for cancer—the control of cancer by drugs. *Life-and-death projects.*

Your help is needed to enable the American Cancer Society to continue this support.

Don't blindfold cancer research. Give to it. Send your contribution now, to CANCER, c/o your local post office. All gifts are tax-deductible.

AMERICAN CANCER SOCIETY



The arrows illustrate the forces every lathe has to cope with: Twisting and bending moments in the bed, carriage and tailstock. Thrust and radial forces in the headstock and quick-change box. Hundreds of reactions to the forces created by cutting—all working to upset accuracy by "give" and by wear.

Although most lathes look alike, there's a world of difference in their design and construction—in their ability to resist the forces of cutting over many years. It's this ability that determines how heavy a cut they will take, their long-time accuracy and how much maintenance they will need.

In the new Regal bulletins you will see how well Regals meet the challenge of these forces.

The Inside Story of LeBlond Regal Lathes

Must Reading for Lathe Users:

Two NEW bulletins describing 15 NEW Regal Lathes models. Write for them now.

Bulletin R-215B
13-15-17-19″
Regals

Bulletin R-206B
21″ and 24″
Regals

LeBLOND of Cincinnati

The R. K. LeBlond Machine Tool Company • Madison at Edwards Road, Cincinnati 8, Ohio

Blood, Sweat, and Volunteers

Many words are written and spoken annually about the desirability of businessmen becoming more active and more articulate in government. Much more is said than done.

Certainly, business is a less effective influence in government than it should be. It is less effective than many minority groups. It is almost silent compared with organized labor.

Too many of us are checkbook citizens. When a campaign year rolls around, we make a donation to the party of our choice and feel we have discharged our political obligations.

We'd certainly be remiss if we ran our businesses that way—and government is our business.

Thirty per cent of the value of all goods and services produced each year go to support government activities. Government is the unseen but greatly felt influence among our directors. At the national level, it can determine whether we have a boom or a bust. It can determine, by its policies, whether we grow or whether we die on the vine.

At the local level, government tells us what we can or cannot do in myriad fields—water and air pollution, noise abatement, safety. It regulates traffic, fire protection, zoning. Whether these necessary controls help or hinder industry depends in large part on the understanding of the problems by the political administrators.

Do we take enough time to get acquainted with our politicians? Do we care enough to acquaint them with our problems?

Some businessmen do.

The Steel Service Center Institute invited members of Congress to be its guests at breakfast during its annual meeting in Washington. Twenty-seven senators and 102 representatives rubbed elbows with the warehouse operators and heard Executive Vice President Bob Welch outline some of the problems faced by industry. The congressmen were impressed.

We believe that is an activity business groups could well adopt, particularly in off-political years.

In our own occasional meetings with national and state legislators, we have found that many are honestly and eagerly seeking information and advice on business problems—problems that can be importantly affected by legislation.

Getting to know your politicians is work, but it's worth it.

After all, politics, as one wag puts it, is only blood, sweat, and volunteers.

Walter J. Campbell

EDITOR

Facts about pickling acid inhibitors

Nearly 40 years ago Amchem developed the first pickling acid inhibitor—RODINE—and with it revolutionized acid pickling. Only a few of the steel mills of the time believed that the addition of less than one percent RODINE to a sulfuric acid pickling bath could save substantial amounts of acid and metal, while increasing the life of the bath. Today there is no mill chemist who does not know about RODINE and its proven performance in eliminating waste of valuable metal and acid, and its ability to pay for itself through the savings thus gained.

In the past few years much attention has been focused on the use of wetting agents to accelerate pickling. But the fact remains that pickling cycles cannot be reduced by the use of wetting agents alone without severe overpickling problems. Wetting agents do help the acid run off surfaces removed from pickle baths, and, in so doing, reduce carry-over of acid into the rinse.

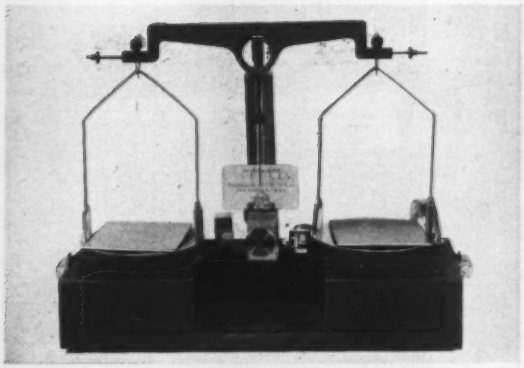
Wetting agents should not be confused with inhibitors to protect the metal and save acid wasted in pitting it. They should not be expected to miraculously speed the removal of scale, even at the expense of wasting the metal. However, the *proper* combination of *real inhibitor* plus correct wetting agent can have beneficial effects on pickling practices.

Only a true inhibitor such as RODINE can offer steel producers solid advantages in pickling. Baths can be operated longer and less acid is required to keep them at desired concentration. Costs of charging and cleaning the bath are reduced, less handling and storing of acid is required. A RODINE bath produces far fewer rejects—steel emerges with uniformly smooth, bright clean surfaces, free of pits, blisters and smut.

When an Amchem Technical Representative enters your pickle house, you can be assured of experienced assistance in improving your pickling. He will recommend the proper RODINE to 1) prevent needless consumption of acid after scale removal, 2) prevent smutting, pitting and overpickling, 3) produce a stable, free-rinsing foam blanket, 4) improve rinsability and reduce carry-over, and 5) produce a brighter, cleaner surface. Only the Amchem Representative can do this for you because he has at his command the most widely diversified and accepted line of real inhibitors and correct wetting agents available.

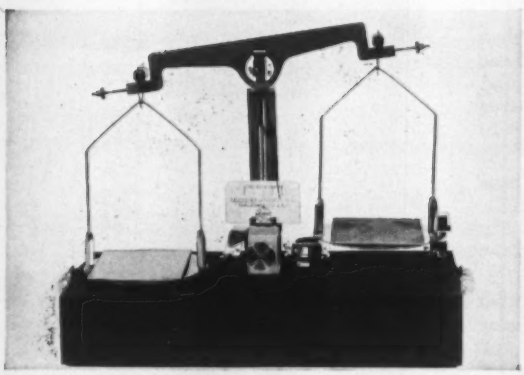
Since the early days of pickling acid inhibitor development, scientists in the Amchem Metal Protection Laboratories have constantly studied methods to make the RODINES stronger, more effective and more economical to use. The RODINES of today, as of 40 years ago, are in a class by themselves, have developed a reputation as *the international standard* in acid pickling inhibitors. The fruit of these years of laboratory research and experience in a highly specialized field, and the assistance of Amchem's trained field representatives—specialists in acid pickling techniques—are at your disposal for the asking.

How Rodine Retards Acid's Attack on Metal

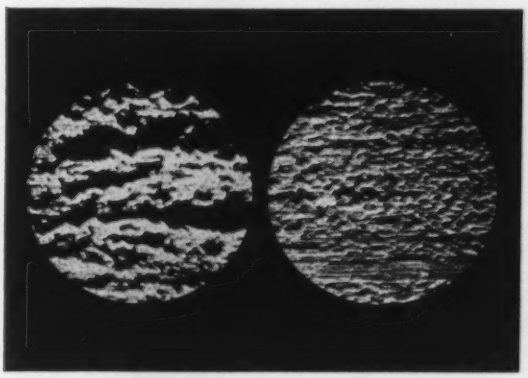


The photographs and microphotographs displayed on this page represent a graphic description of results demonstrating the effectiveness of RODINE in retarding the attack of acid on the metal. NO WEIGHT DIFFERENCE—two identical panels of low-carbon steel are shown being weighed here. They balanced the scale.

RODINE MINIMIZES ACID ATTACK—Each descaled panel was placed in a beaker containing 10% by volume of 66° Bé sulfuric acid of 160° F. The acid in the right-hand beaker was uninhibited. Acid in left-hand beaker was inhibited with RODINE 82, ¼% by volume of the concentrated acid. There was little or no hydrogen evolution in this beaker . . . RODINE retarded the attack of the acid on the base metal.



RODINE SAVES METAL—Both descaled panels were removed from the acid pickle solutions after 5 minutes. The one pickled in the uninhibited acid had lost 1.4% of its original weight. The one pickled in the RODINE-inhibited acid had lost only 0.001% of its original weight. This represents a saving of 26 lb. of steel for each ton pickled; and a simultaneous saving of nearly 50 lbs. of 66° Bé sulfuric acid when RODINE is used to inhibit the acid.

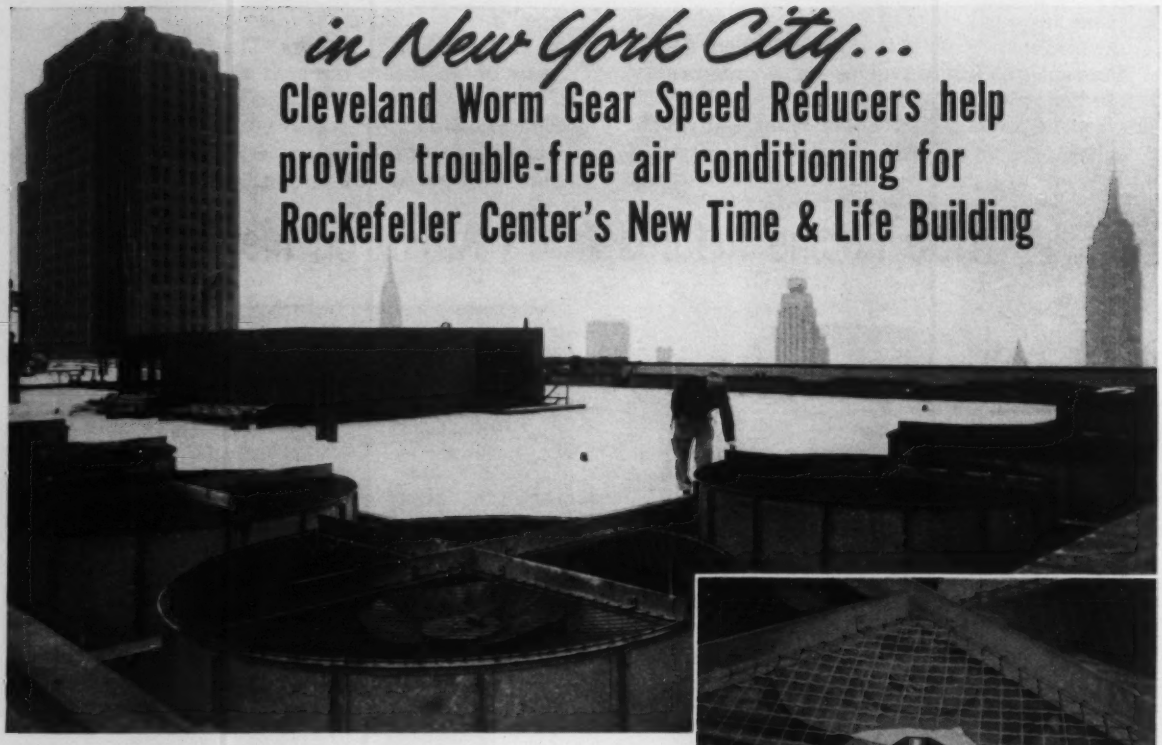


EFFECT OF UNINHIBITED ACID ON THE PANEL — This microphotograph of the low-carbon sheet steel pickled in the uninhibited acid shows deep pits and the crystalline character of the surface after 5 minutes in the solution.

EFFECT OF RODINE-INHIBITED ACID ON THE PANEL — This panel was pickled for 5 minutes in the RODINE-inhibited acid, then microphotographed. Only scale pockets and roll marks are visible; no pitting of the low-carbon sheet steel occurred.

AMCHEM RODINE

Amchem and Rodine are registered trademarks of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.



in New York City...

Cleveland Worm Gear Speed Reducers help provide trouble-free air conditioning for Rockefeller Center's New Time & Life Building

Playing an important role and forming an integral part of this 48-story building's all-important cooling system are 21 type CU Cleveland Worm Gear Speed Reducers designed especially for high-speed, heavy duty continuous service under extreme conditions of both heat and humidity.

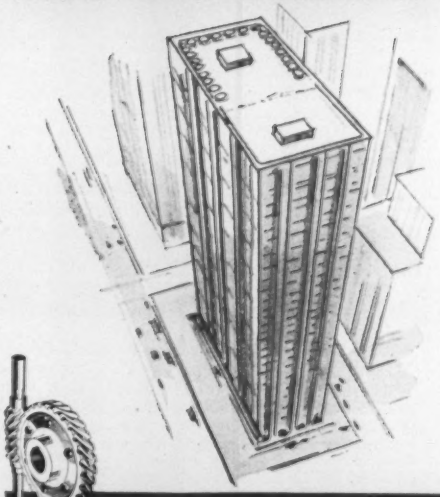
As related by Mr. Charles A. Fenster, president of Phillips Cooling Tower Company, Inc., Brooklyn, New York, "These Cleveland Drives—installed between the cooling tower fans and their electrical drive motors—will give many years of trouble-free service even though this type installation is the *most severe* to which speed reducers can be subjected.

"Because we can provide no solid vibration-free concrete base for mounting the reducer, some movement will always exist. Thus, the Cleveland Drive's design and construction is put to the fullest test. Only a quality product could possibly provide the long service life we know the Clevelands will give us.

"We've used Clevelands over a period of 22 years for two reasons: They provide us the best quality product in the greatest number of ratios. And, they're generally regarded by users as the best cooling tower drives available anywhere—give the greatest service life."

Inherently quiet operation of Cleveland type CU Drives make them ideal for air conditioning public buildings, theatres and department stores. In addition, they have gained wide spread acceptance for industrial applications such as driving induced draft fans in catalytic cracking plants and public utilities where large volumes of process water must be cooled.

Why not specify these versatile Cleveland Drives for your most demanding applications. A more complete story of these rugged CU units is contained in free, fully illustrated Bulletin 135-S. Write for your personal copy, today.



CLEVELAND
Worm Gear
Speed Reducers

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

To gain bargaining strength . . .

UAW's Reuther Searches for a Rallying Point

ANYTHING can happen, but as things stack up now, look for a peaceful settlement of the auto negotiations this summer. Probable terms: A two year contract with a package cost that's below what a panel of AFL-CIO economists predicts. (They say it'll be 8 to 10 cents per hour per year.)

That's the opinion of most labor observers as bargaining teams of the automakers and the United Auto Workers map their final strategy for negotiations which open with General Motors Corp. on June 28, followed by Ford Motor Co. on June 29 and Chrysler Corp. on July 1.

• **The Setting** — Walter Reuther, UAW president, needs a good rallying point to strengthen his hand. Here's why:

1. The economic climate favors the auto firms. Auto sales have turned up in recent weeks, but sales this year are expected to be in the 5.6 million to 5.8 million range—including 400,000 imports.

2. The cost-price squeeze is as tight as ever, and the Kennedy administration is applying pressure wherever it can to hold down inflation.

3. Mr. Reuther has a bagful of internal problems that aren't helping his case much—he has been sparring with George Meany on how the AFL-CIO should be run; his whitecollar drive has faltered; and some of his workers are obviously unhappy. (One Chrysler local recently attempted decertification.)

But don't count peppery Walter out. Negotiations could bog down on several key issues—any one of which could push the emotion button he's looking for.

• **Areas of Conflict** — Take the cost of living provision. Both Ford and Chrysler are almost certain to push for its elimination—it cost the automakers 3 cents per hour in 1959 and 4 cents in 1960. General Electric Co. and Westinghouse Electric Corp. abolished the provision in their negotiations. The steel industry was able to clamp a ceiling on the increments and help control costs by tying them to insurance costs.

The big question mark is GM—with whom the cost-of-living (C-O-L) clause originated. Some of its officials feel the provision is not inflationary—others are believed to be in favor of abolishing it.

This poses a real headache to Ford and Chrysler if it comes to taking a strike over the issue because the timing will coincide with new model introductions.

Carrying a question mark too is the annual improvement factor. This clause gives the workers a 2½ per cent wage increase (6 cent minimum) annually as their share of technological improvements. It has been in effect since 1955. The automakers may not fight as hard for the elimination of it as for C-O-L because it also contains a provision

"We plan to bargain separately" — AMC

"As in the last two contract negotiations, American Motors Corp. will strive for a settlement all its own," says Edward L. Cushman, AMC vice president. "We have not followed the pattern in previous contracts. We feel there are some seniority problems that must be mutually resolved. Also, we have different situations governing the automotive and appliance workers covered by our contracts."

permitting the companies to introduce improvements without union interference.

• **Job Security Important**—The real bargaining knots will be hit in provisions dealing with job security. Of the UAW's 1.1 million members, some 800,000 are claimed as automotive workers. Yet some observers feel that even with a return to near full employment, there'll be jobs for only about 600,000 men.

Kenneth D. Cassidy, vice president-industrial relations at Ford, stresses: In the face of intensive competition in this country for the consumer's dollar and competition from abroad for the world's auto markets, we have no choice but to be more concerned than ever about costs of all kinds—including labor costs.

Foreign competition threatens workers' jobs, and Ford, for one, has reportedly collected a horde of facts and figures aimed at comparing wages and productivity of overseas workers with those of U. S. employees. Cost comparisons will include data on the manufacturing of parts as well.

Mr. Reuther may do some shouting about a 32 hour workweek (as the Steelworkers' president, David McDonald, is currently doing) and a salary for wage earners, but few expect those demands to become real issues.

• **Bigger Role for SUB Funds?**—The real bread and butter bargaining will be over the extension of provisions in Supplemental Unemployment Benefits (SUB) covering severance pay, more benefits for short workweeks, job transfer allowances, and possibly retraining programs.

The SUB funds of the Big Three are at the maximum level, so the firms aren't making any contributions to it. The funds may hold the key to handling the security provisions the UAW will push for.

But such talk has a hollow ring to the many supplier firms that look to the auto talks for patterns in their own bargaining, feels Kenneth Porter, director of research, Employers Association of Detroit. "From a practical standpoint, it doesn't matter much because the SUB funds of smaller firms are nearly always broke . . . they've never had a chance to build them up."

Work rules relating to grievance procedures and seniority (as affected by changes in standards) may bring some skirmishes. Leonard Woodcock, director of UAW's GM Department, charges: "In many ways, GM's grievance procedure is the most antiquated of all the companies we deal with. We're going to demand a bigger role in policing the agreement day by day." Hassles over seniority and work rules could trigger some strikes by some union locals.

• **Government's Role**—In talking with Washington labor people, STEEL reporters gain the impression that the Kennedy administration will officially stay out of the negotiations. But if a strike does develop, it's felt that Labor Secretary Arthur Goldberg will move in quickly and try to pressure a settlement through threat of government arbitration. The government would favor the union demands as long as they were not too inflationary and did not include the short workweek, which the President opposes.

Russia's Steel Output Matched U.S. in 1st Quarter

WORLD STEEL production in the first quarter was 86.3 million net ingot tons, down 12 per cent from the same 1960 period, reports the Commerce Department.

The 11.6 million ton decrease was influenced primarily by the sharp drop of 15 million tons in U. S. production. Japan and the USSR experienced increases of more than 1 million tons each and helped offset the decline.

USSR production of 19 million tons nearly equaled the 19.7 million tons reported by U. S. steelmakers for the quarter. Japan again enjoyed the highest rate of increase—19 per cent, to 6.8 million tons in the first period.

Rising production in the U. S. during April, an all-time high in April for Japan, and expected increases in Europe add up to a better outlook for the second quarter.

Price Hike Coming, Profit Picture Will Improve

LOOK FOR a general price pickup this fall. Industrial production is expected to reach a new high in the fourth quarter. Profits will improve too.

That's the forecast Alan Greenspan, Townsend-Greenspan Co. Inc., New York, made to members of the Industrial Heating Equipment Association meeting in Hot Springs, Va., last week.

• **Economy Picks Up** — Capital goods are beginning to move, he told the heating equipment builders. He feels a new wave of expansion in production facilities may be coming—which will mean more emphasis on new equipment, less on replacement items.

He also looks for improvement in other segments of the economy, including chemicals, oils, textiles, and paper.

But housing starts, which have shown improvement recently, may be disappointing. The increasing vacancy ratio is a signal that this industry's upturn may be slow.

• **Labor Costs Improve** — The strengthening of prices should help bring some profit improvement. Many firms will also get relief in the area of unit labor costs. There was little gain in output per man-hour last year, but the trend has been upward this year.

Mr. Greenspan did not predict a uniform pickup in profitability. "Most of the profits will go to those who are able to cut leadtimes and improve their deliveries," he said.

The outlook for the economy generally, as Mr. Greenspan sees it, shapes up like this: Irregular growth for about a year, then a flattening in the summer of 1962. One unknown factor: Steel industry negotiations and the threat of a strike which could lead to some inventory accumulation.

• **Dark Cloud** — His forecast was not all optimistic. He sees a possible recession developing in mid-1962, which could carry into 1963.

Executives of heating equipment firms report that their orders have been slow in reflecting the general business recovery. But Robert E. Fleming, executive vice president of IHEA, predicts that the industry's slow first half will be followed by a sharp and sustained upturn in the third quarter.

Marketing Exec Stresses Need for Packaging VP

PACKAGING has become a $20 billion-a-year business. But it has also become costly. It is not uncommon for the "package" to account for as much as 20 per cent of product price.

That's why A. J. Gardner, marketing vice president of the Packaging Div. of Olin, believes: "The man responsible for packaging decisions is destined to become a part of top management."

Speaking before the 30th National Packaging Conference of the American Management Association in Chicago, Mr. Gardner pointed out: Packaging problems are becoming increasingly complex. Only top management can effectively integrate packaging with marketing, production, and research.

"The position of vice president for packaging will not be uncommon in a decade. Packaging experts are needed to supervise the spending of the huge sums involved. A major problem in the coming years will be to find capable executives skilled in this field."

• **Pitfalls in Packaging**—He believes that only a soundly managed program operated from the top management level can eliminate a number of common packaging pitfalls:

1. Underpackaging a product in terms of protection or sales appeal loses customers.

2. Overpackaging is costly. Paradoxically, a drab, heavyweight package may represent overpackaging as protection, underpackaging from the standpoint of sales appeal.

3. Slowness in packaging development or persistent "me-tooism" can cost a company sales leadership. Packaging must be co-ordinated with the corporate image, advertising promotion, and introduction of changes in the packaging line in the plant. But it is still a costly afterthought in the plans of many companies.

Improved packages, cost reduction, and increased sales will result from an upgrading of the status of the packaging executive, Mr. Gardner believes.

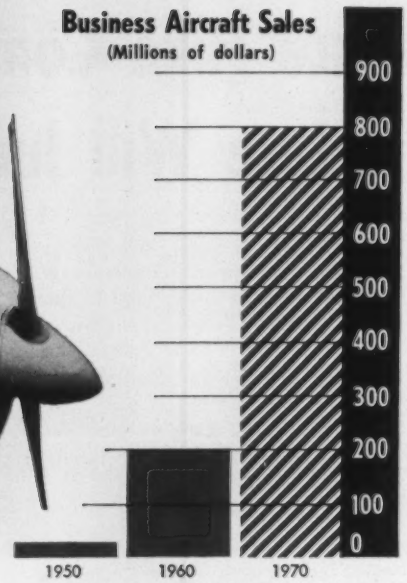
Florida Juice Processor Ups Aluminum Can Output

MORE lines for the assembly of 6 ounce aluminum cans for frozen juice concentrates have been built in Florida. Minute Maid Co. has placed a second line in operation at its plant in Auburndale, raising its annual capacity to 160 million cans. The Auburndale plant uses about 50 million of them. The remainder are shipped to plants at Plymouth and Leesburg, Fla.

Machinery capable of producing about 80 million cans a year is in operation at Winter Garden Citrus Products Co-operative at Winter Garden, Fla. Fabricated can ends and flat sheets for the can bodies are supplied by Reynolds Metals.

Machinery suppliers include: E. W. Bliss Co., bodymaker, sheet slitter, flanger, and air tester from its Hastings, Mich., plant; Angelus Sanitary Can Machine Co., Los Angeles, seamer for attaching can ends; and Barker Co., Tampa, Fla., conveying and accumulating systems.

Beech Aircraft Corp.



Source: Aerospace Industries Association.

Business Plane Sales Fly High

"NO OTHER INDUSTRY in the country is growing as fast as the general aviation industry. While rockets, missiles, and global jet transports make dramatic headlines, the production of business and utility airplanes quietly continues to accelerate at record-breaking rates—making money for manufacturers, retailers, and users alike."

That's how Leddy Greever, vice president of Beech Aircraft Corp., Wichita, Kans., describes the airplane industry which made deliveries in the last two years at an annual rate almost twice the average for the last ten years. Production increased 700 per cent from 1950 to 1960 and industry leaders expect to double their volume by 1965.

• **Market for Metalworkers** — Although business airplane builders do most of their own fabricating, they constitute a large market for other metalworking and allied industries. An estimated 50 per cent of the cost of an airplane goes for materials and components such as engines, instruments, and electronic parts.

Cessna Aircraft Co., Wichita, Kans., which had net factory billings of $56.6 million last year, estimates it spent $33 million for materials. That includes raw materials, such as aluminum and steel, as well as components like tires, propellers, and radios. Cessna has 850 venders that supply components for its airplanes and 300 that supply raw materials.

The eight airplane manufacturers listed by the Utility Airplane Council of Aerospace Industries Association had net factory billings of $151.2 million in 1960.

• **New Uses**—In many modern industries, use of the airplane has become routine. It is no longer limited to executive transportation; it carries engineers and technical personnel to branch plants for special and emergency assignments; it has become part of the sales program to bring customers to plants to see machinery and equipment in operation.

Scully-Jones & Co., Chicago, manufacturer of machine tool accessories, uses a Navion single engine plane to cover sales territories. Dudley Lockrem, vice president and director of marketing, claims he can cover a territory in three days that used to take an earth-locked salesman two weeks to cover.

William T. Piper Jr., executive vice president, Piper Aircraft Corp., Lock Haven, Pa., says business use of smaller aircraft has just begun and, in time, companies will "realize that the smaller and less costly aircraft can be efficiently utilized by all branches of their operations."

• **Helicopters Save Time**—The use of helicopters in business has expanded rapidly in the last several years. Oil companies fly large rotary wing aircraft to offshore drilling platforms. Other business helicopters provide speedy movement of personnel between offices and plants in metropolitan areas where surface transportation moves at a slow pace.

Cessna has just started to market a light rotary wing aircraft called the Skyhook which is designed to fill the gap between the few minutes' drive and the long air trip. Del Roskam, vice presi-

dent, Aircraft Div., says more than 12,000 firms or individuals in the U. S. could profitably use the Skyhook.

• **A Growing Business**—The size of the business airplane fleet is growing rapidly. In 1960, business planes totaled 31,500 vs. 15,000 in 1950. Estimates place the fleet at 45,000 by 1965, 60,000 by 1970, and 71,000 by 1975.

Total retail sales of business and utility airplanes from 1950 to 1960 jumped from $25.5 million to $200 million. AIA anticipates annual sales of $800 million by 1970.

The single engine, three place and over airplane continues to be most popular for business flying but the light, twin engine craft is gaining. The single engine, two place craft ranks third. Large multiengine, nine place and over aircraft used by many large corporations for executive transportation account for less than 8 per cent of the fleet.

Still the mainstay of the business aviation fleet for a long time is the internal combustion engine. The pure jet, uneconomical for most business flying, generally cannot be handled by private fields. The turboprop, however, is coming.

Grumman Aircraft Engineering Corp.'s (Bethpage, N. Y.) new Gulfstream uses twin Rolls-Royce turbines. The Sikorsky S-62 helicopter is powered by a General Electric Co. gas turbine. Beech and a French group, Societe Francaise d'Entretien et de Reparation de Materiel Aeronautique, have signed an agreement for the development of a turboprop engine for Beechcraft planes.

• **Opportunity for Plastics**—Metals are losing some ground to plastics in light aircraft construction. Cessna, for instance, has its own shop where reinforced plastics are molded into such parts as wing tips, wing strut fairings, dorsal fins, and ends for wing tip tanks. The plastics reinforced with glass fibers are strong, light, easy to replace, and cost less than metal.

The business airplane industry has been relatively unaffected by the current recession. It continues to grow at an amazing rate and provides an ever increasing market for thousands of material and component suppliers across the country.

Reciprocity Can Be a Dirty Word

USING THE TERM "reciprocity," without explaining the context in which it is used, will invariably imply an abused business relationship.

In a highly competitive economy where companies are striving to keep their heads above water, some reciprocal relationships are bound to exist. In most cases, they help build corporate ties and friendships, while posing no problem of abuse and control. "I'm glad to scratch your back since you've scratched mine."

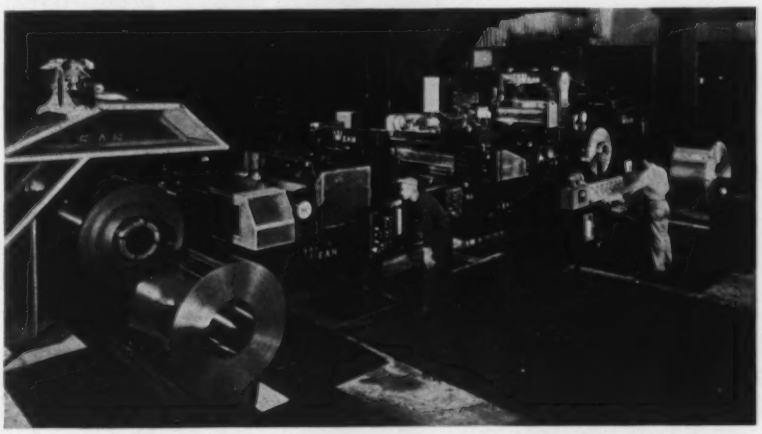
The abuse of reciprocity comes when the decision making responsibilities of purchasing people are usurped by the selling function to strengthen a sales position. Here little or no consideration is given to the value of competitiveness of the product. The guide then becomes: "I'll scratch your back *only* if you'll scratch mine."

To guard against abused reciprocal relations, many companies today are carefully defining their policies. Such policies generally state: ". . . to favor valued customers, providing their product, delivery, service, and price are competitive."

STEEL in its article on "Long Term Contracts Can Pay Off" (May 15, p. 60) presented out of context a reference to reciprocity made by George O. Pfaff, director of marketing, Wheelabrator Corp., Mishawaka, Ind. The editors regret this error.

In discussing long term contracts with respect to services Wheelabrator offers its customers, Mr. Pfaff said:

"All of these (service) contracts are also on a one year basis. We are always trying to increase our long term buying and selling, but competitive factors are always working against this. No small matter is reciprocity. We do business with many of our suppliers, particularly in the equipment end, and it is not uncommon for a company ordering a machine to request that the machine be equipped with its own components. Wherever possible, we try to accommodate the customer."



Tin Plate Plant Gets Rapid Recoiler

STEEL STRIP is side trimmed and recoiled at 4000 ft a minute on a line put into operation at the Irwin (Pa.) Works of United States Steel Corp. Part of the plant's electrolytic tinning facilities, the line can process coils weighing up to 36,000 lb.

Steel Industry Braces for World

WHILE STEEL was harder hit than any of the basic industries, it has come through the recession stronger than it ever has been. It is better prepared for whatever the future holds.

So declared Benjamin F. Fairless, president, American Iron & Steel Institute, at the organization's 69th general meeting in New York last week.

"Your production facilities and techniques," he told producers, "are competitive to the hilt. And they are in a persistent state of dynamic improvement."

For example, he noted that at least 70 new steels have been placed on the market in the last 12 months, and more than 30 new surface treatments have been developed. Still others have yet to be announced, he said.

• **Opening Markets**—Some of the products have opened new markets for steel, while others have preserved markets threatened by competitive materials or imported steel.

The industry has also made notable progress in the preparation of raw materials, in the relationships and communications with employees, in marketing and promotion of industry products, and in fostering better understanding of steel as a product.

• **Training Men**—Max D. Howell, AISI executive vice president, said that training is one of the important features of the institute's research program. "If we are to survive competition—both from foreign steel industries, with their lower wage costs, and from other materials producers in this country—we need a continuing flow of men thoroughly grounded in the technology of the steel business," he emphasized.

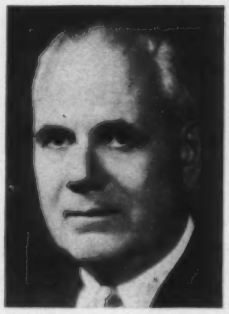
The challenges that face those men and the industry were cited by Logan T. Johnston, president, Armco Steel Corp., Middletown, Ohio. He cautioned the steel industry that its operations can no longer be based exclusively on domestic markets and exports and that the opportunities for future success lie in the creation of a truly international industry.

He believes the nation has become a net importer of steel and that export markets for U. S. steel have shrunk alarmingly.

• **Awareness Needed**—"The changes that have taken place in the world are, in my view, clear proof that this industry can no longer operate as an entirely American enterprise. To do this would be like trying to

Steel finished the recession stronger than ever . . .

BENJAMIN F. FAIRLESS
President
American Iron & Steel Institute



Future success lies in an international industry . . .

LOGAN T. JOHNSTON
President
Armco Steel Corp.

U. S. rate of growth is disturbingly slow . . .

LUTHER H. HODGES
U. S. Secretary of Commerce

The challenge: Keep costs and prices down . . .

ARTHUR F. BURNS
President
National Bureau of Economic Research

Competition

AISI WINNER

The institute medalist was A. L. Hodge, Newark, N. J., associate manager, Gas Process Development, Linde Co., a division of Union Carbide Corp. Mr. Hodge was honored for the best technical paper presented at last year's AISI general meeting. Its title: "Predicting Effects of Oxygen Moisture and Fuel Additions on Blast Furnace Operation with Electronic Computers."

ignore an elephant in our own livingroom," observed Mr. Johnston.

He estimates that world demand for steel (outside the U. S.), could well be 250 million tons greater by the mid-1970s and believes that U. S. steelmakers will not get an adequate portion of the markets through exports alone. "The demand abroad," he said, "will be met primarily by foreign producers. If we are to have a proportionate share of this market, we must get inside it and become a part of it."

Mr. Johnston stated that higher labor and capital equipment costs in the U. S., along with "antique" depreciation provisions and foreign trade barriers have cut the steel industry's participation in foreign markets by about 85 per cent in 13 years. Moreover, he said: "It's no secret that some foreign steel products actually surpass their U. S. counterparts in quantity and use in this country."

• **Foreign Threat**—Discussing foreign competition, Arthur F. Burns, president, National Bureau of Economic Research, New York (former chairman of President Eisenhower's Council of Economic Advisers), said that unless the problem posed by the balance of international payments is properly solved, it will not make much difference whether imports increase or diminish.

In general, he is opposed to protective devices such as higher tariffs, import quotas, exchange controls, and export subsidies. He believes they would lead to retaliation if they were employed on any appreciable scale. "Those measures would weaken our international political position and might aggravate our export problem . . . The only constructive path open to us is to produce the right goods and to offer them at the right prices," he asserted.

Mr. Burns said this country is faced with the challenge of keeping costs and prices down.

• **Incentive for Growth**—Commerce Secretary Luther H. Hodges told the AISI: "There is no question but that the economy is on its way up." He warned that "full economic recovery in 1961 involves far more than the spin of the business cycle." Our gross national product, he said, has gone up an average of 3.4 per cent a year since 1947 (in constant dollars). Since 1950, Germany's rate of growth has been 10.7 per cent; Italy's, 8.5 per cent; and France's, 6.6 per cent. He figures the economy will be at an annual GNP rate of $525 billion to $530 billion by the end of this year. He is worried that the recovery of the U. S. from the 1960 recession will still leave an unemployment rate of 6 per cent. His theme: "We cannot be satisfied with this kind of recovery."

He spoke of the desire for achieving full employment and said the goal can be reached partly by more investment in education, health, natural resources, research and development, and modernization of business plant and equipment. The secretary noted that we lag Japan, Canada, and Western Europe in capital formation (figured as a percentage of GNP). He favors the Surrey Plan as an incentive to capital investment here, but he added that depreciation reform "may be developed in a thorough going study of tax reforms."

• **Short Term Outlook**—Leading steel executives at the AISI meeting agreed that there probably was enough strength in the economy to keep steel production from going into a slump during July and August. They said production was continuing on an uptrend and that the trend should continue during the second half. However, some said June output might not be quite as good as that in May.

• **Memorial Lecture**—Dr. James B. Fisk, president, Bell Telephone Laboratories, Murray Hill, N. J., delivered the 15th annual Charles M. Schwab Memorial Lecture. He talked about development work on communication satellites and the use of manmade sapphires to protect solar cells from space radiation. He said the gems would enable "working" telephone satellites to endure the rigors of space for ten years or more. A ground station in Maine, part of the Bell System's satellite communication program, will be ready early next year. The first test satellite will be ready at the same time if the government designates a launching vehicle soon, he said.

• **Awards Given**—A. B. Dove, product development metallurgist, Finishing Works, Steel Co. of Canada Ltd., Hamilton, Ont., received the regional technical meeting award in the field of operations. Regional technical meeting awards in research went to William Spackman, director, Coal Research Section, William F. Berry, research assistant, Department of Geology, and Russell R. Dutcher, assistant director, Coal Research Section, all of Pennsylvania State University; and A. H. Brisse, assistant director, Raw Materials Utilization, Applied Research Laboratories (Monroeville, Pa.), U. S. Steel Corp.

Export Bandwagon Rolls Faster

Rep. Multer proposes an Exports Credit Guaranty Corporation

EVERYONE in Washington agrees U. S. exports need a boost.

Administration leaders have some pet plans that will be revealed soon. Meanwhile, congressmen are offering their own.

One plan being proposed by Rep. Abraham J. Multer (D., N. Y.) calls for a federally charted "American Export Credits Guaranty Corp.," which would provide central facilities for all U. S. exporters. Co-sponsor of the plan is Rep. William A. Widnall (R., N. J.).

The corporation would insure almost any export commodity against normal business risks. In addition, exporters would be protected from losses resulting from expropriation, political situations, or other actions taken by foreign governments. The program would put U. S. exporters on an equal footing with foreign exporters who have similar government institutions available to them.

One big item: Proposed credit terms would match or better those available overseas. Exporters would be covered on short term, consumer goods sales up to six months; medium term, capital goods up to five years; and items like jet aircraft, services (engineering, leases), and special situations up to seven years.

Under Rep. Multer's proposal, the corporation would charge exporters a small fee. The organization would also be able to borrow funds from the U. S. Treasury. Establishment of the corporation would be accomplished by selling shares to insurance companies, exporters, and financial agencies.

● **FOREIGN CORPS**—On the Senate side, Sen. Clair Engle (D., Calif.) seeks to aid export expansion by setting up a "Foreign Commerce Corps" under the Commerce Department. It would include on its staff commercial officers serving in foreign posts directing the Export-Import Bank of Washington, giving the Small Business Administration special help, promoting government sponsored market surveys, and encouraging the formation of exporting associations.

Exporting associations are of interest because under the Webb-Pomerene Act for export business, firms can band together and not be subject to the charge of violating antitrust laws. The Engle proposal would have such associations use government paid warehouses overseas. Co-sponsoring the proposal is Sen. Warren Magnuson (D., Washington).

● **HELP FOR MACHINE TOOLS**—These plans would help machine sales abroad, but more direct aids are under consideration at the White House level. Special Export-Import Bank provisions for sales of capital goods have been discussed. A special State Department effort to get foreign countries to lower tariff barriers against U. S. capital goods has been recommended, and a new attitude toward trade with Communist Bloc countries will soon be expressed by President Kennedy.

● **RED TRADE POSITION**—Commerce Department sources describe the Red trade relations policy this way: Rules will be more practical in the light of shipments of so-called "strategic" goods to the Communists by our allies. Industry will be asked to co-operate with the government in providing as much information as possible about comparable products available from other sources when they apply for export licenses to the Red Bloc. Information on the capability of the equipment for mass production and its uniqueness will help the Commerce Department decide whether to grant a license.

In the first quarter this year, Commerce Department approved applications for licenses to send $23.8 million worth of products to Communist countries. Applications to export another $24.9 million worth were rejected.

● **PROGRESS TO DATE**—Exporters are encouraged by the Commerce Department's promotion of exports. Reports on overseas trade possibilities are coming to the department in record volume. You can get a market report on an area in two or three days. Officials are hoping to boost its trade mission program to 25 a year (vs. 12 now) and is actively seeking businessmen to make the trips.

● **CHALLENGE TO INDUSTRY** — Washington sources also agree that one of the major hurdles is finding more U. S. firms willing to move into the export field.

NEW PRODUCTION IDEAS

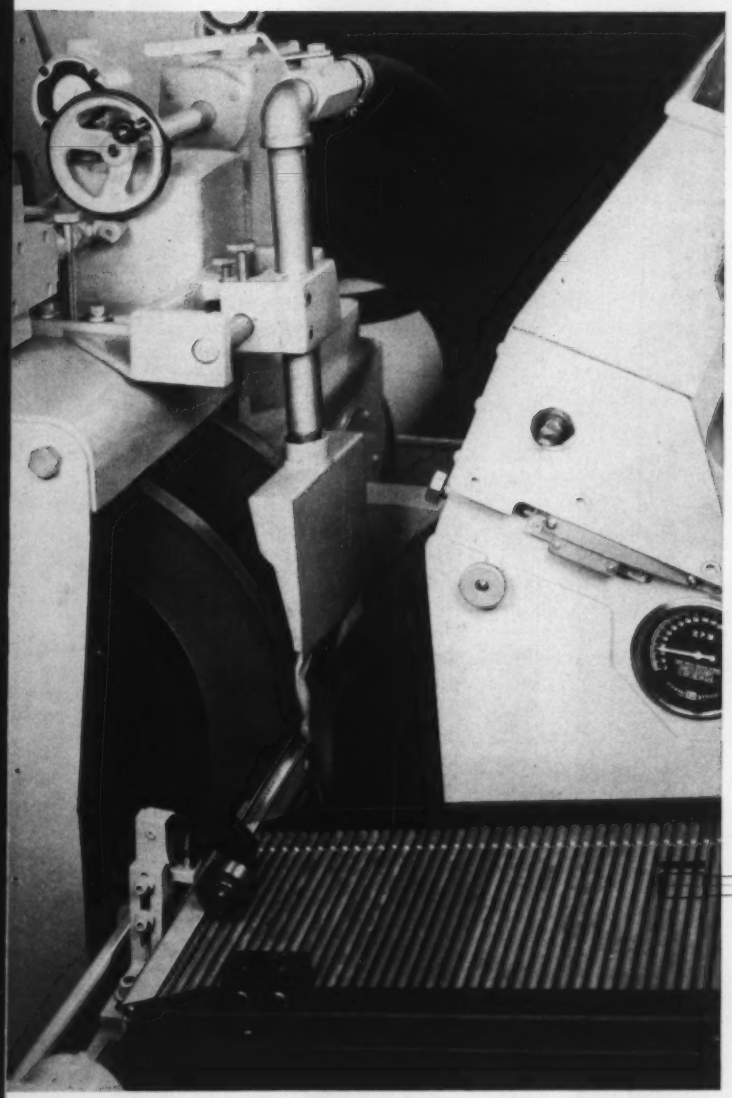
and new ways to reduce grinding costs are being developed every day by Cincinnati Grinding Specialists. Consider, for example, the three parts illustrated below. CINCINNATI Centerless Grinding Machines were tooled up to perform these grinding operations at the lowest possible unit cost.

Part A is a shaft 8½″ long, demonstrating an operation having wide application. Three diameters at the ends of the shaft are ground to accurate size and exactly in line with each other, on a CINCINNATI No. 220-8 Centuramic Centerless.

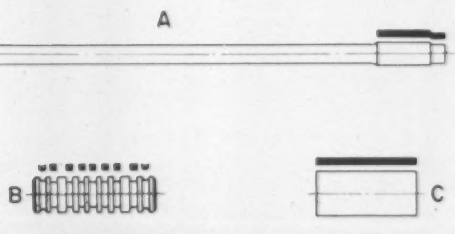
Smallest of the Cincinnati line, the No. 107-4 Centuramic was tooled up with crush truing equipment to grind grooves from the solid in ½″ diameter spools—Part B. Electro-hydraulic automatic infeed and automatic loading maintain a uniformly high rate of production for work of this type.

The No. 340-20 Centuramic Centerless, powered by a 40 hp spindle drive motor, makes quick work of short steel pins—Part C. In two passes, .007″ stock is removed at the fast thrufeed rate of 15 ft. per min.

CINCINNATI Centerless Grinders, coupled with 39 years of centerless engineering service, are outstanding candidates for your immediate and future cost-reduction program. May we give you more information? Write for Catalogs G-727-1-D and G-703-2, then give our Grinding Specialists an opportunity to study your production problems. **Grinding Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



Grinding three diameters at the ends of shafts 8½″ long (Part A). CINCINNATI No. 220-8 Centuramic Centerless Grinding Machine is tooled up with automatic work handling for this operation.



Three ideas in low-cost centerless grinding. Heavy lines indicate ground diameters.

CINCINNATI

GRINDING MACHINE DIVISION

PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • CENTERLESS LAPPING

The 27 Traits

TOP: H. Westcott Shaw administers a spatial intelligence test designed, in part, to indicate a man's ability to handle technical and design problems. A good engineer will score high on this test, one of a battery used to determine a man's capacity in 11 different areas of intelligence.

CENTER: Dr. B. Balinsky administers the Rorschach ink blot test. The man's responses indicate his creativity, use of energy, personality characteristics, and general emotional stability. This test is a highly sensitive measure and it takes a highly trained professional to interpret the answers.

BOTTOM: Dr. M. R. Feinberg interviews the job candidate. He probes the man's experience, goals, and current job aspirations. Eventually, the findings of all three psychologists will be integrated into a report describing the man's characteristics and potential, and offering an individual program designed for his personal growth.

YOUR COMPANY's future lies not in your products, but in the brainpower behind them. Paramount is the caliber of your executives and professional personnel.

To get a useful indication of what makes a good executive, STEEL went to BFS Psychological Associates Inc., New York, a firm specializing in testing and counseling industrial managers. The company's psychologists have tested 3000 executives and used the findings to compile a list of traits most commonly found in good managers.

Dr. M. R. Feinberg, president, asserts that you will seldom get the ideal man. Few such persons exist. He further cautions that the lack of any one or more factors doesn't, in itself, mean that the man will be a poor manager. But "there are combinations of holes, ascertainable through testing, that will indicate a man's inability, under usual circumstances, to handle an execu-

# of a Good Executive

tive post," says Dr. Feinberg.

H. Westcott Shaw, Dr. B. Balinsky, chairman, and Dr. Feinberg listed for STEEL the 27 traits most common to good executives. Here they are:

1 A superior level of intelligence (in the top 15 per cent of the population) is a prime requirement. Asking a man with an IQ of 150 to work for a man with an IQ of 110 can be a drastic mistake. Too often, such a supervisor will fail to grasp the significance of a new idea suggested by his more intelligent subordinates. Or he will think and speak on a level that will only frustrate the men reporting to him.

But the IQ score alone doesn't guarantee industrial success. Take the man with an extremely high IQ, but a lack of social understanding. He might be a terrific asset to the company as a lone wolf, but will likely be a failure as a manager. Reason: He may not have the ability to work intimately with people. A man's social relations ability can be determined through testing. The test discovers his sensitivity to subtle cues. Some people, says Mr. Shaw, are so concerned with their own immediate needs that they're unable to recognize the needs of others. Such men make poor managers.

2 There are 11 separate components of intelligence. The executive must rank extremely high in five of them: 1. Vocabulary. 2. Social comprehension. 3. Arithmetic. 4. General information—he must be well acquainted with what is going on in broad areas such as current events, politics, the theater, and the academic sphere. (Mr. Shaw says it's possible for a man to be a good engineering executive without this trait, but that the man won't be a good top executive.) 5. The ability to differentiate between essentials and nonessentials.

3 The good executive should have a high abstract ability, but it must be balanced by good practical judgment. Abstract ability is talent to put principles together and come up with a new idea or concept or product. But this doesn't mean that the product or idea will have any value. Practical judgment must be combined with the abstract ability. A balance helps to insure that the executive will use his high intelligence in the areas that contribute most to profitability.

4 The good candidate for an executive post will be aware of subtle details in social situations and will have the ability to translate that comprehension into action. For example, he'll be able to take a cue from the tone of voice or other mannerism of the person with whom he is dealing, recognize the true feeling of the person in that way, and react in a manner that gets mutual understanding on the immediate goal. He possesses, in the words of the psychologists, "sensitivity as well as spontaneity." He can perceive people's reactions and act appropriately.

5 An executive must have a warm personality. He must be able to express his feelings to colleagues and subordinates in an attractive manner. He must be sincere in his efforts to help others in times of crisis. Too often, says Dr. Feinberg, a subordinate feels that he has "reached out" for the executive "but there was nobody there."

6 The good executive has poise and strength in presenting his own ideas. He has the ability to communicate an image of personal strength. This trait is measured by throwing out controversial statements during an interview and watching the candidate's response.

7 The outstanding executive has the capacity to bring about agreement even when there are many diverse elements. He looks for solutions instead of compromises.

A simple illustration of this point: One girl in the office likes the window open and the other can't stand the draft. The good executive, confronted with this problem, won't open the window half way; he'll rearrange the desks.

8 "Sincerity and honesty are prime requisites for a manager," notes Dr. Balinsky. He points out that the good executive is not afraid to criticize but that he does it for his subordinates' own development and growth. He does not lash out at people's limitations, but tries to maximize their strengths. "The manager must be honest with himself to do this effectively," Dr. Feinberg warns.

9 The good executive must be able to work effectively under pressure. Some top-flight managers actually work better under pressure.

This trait can be measured by a professional psychologist, says Dr. Feinberg. Part of the measurement involves observing the man when he is taking a test with a time limit. As the problems become more complex, can he control his anxiety? How does he function in the clutches? Does he continually ask you to repeat the question? Does he suddenly have trouble with simple questions? Does he go on the defensive? Does he give up? How is he doing at the end of the test? Most top people will relax and enjoy it.

10 Competent managers pay attention to details and, more importantly, they know how to integrate the details into workable and clear patterns, says Dr. Balinsky. The manager is sensitive to details, but doesn't get lost in them, says Mr. Shaw.

11 Effective executives can shift rapidly from one procedure or topic to another. They can be thoroughly immersed in a study of whether to buy numerical control equipment one minute and completely concentrate on a new advertising campaign the next. They open up only one drawer of their minds at a time.

12 Creative ability is important in a manager. He must be imaginative, be able to see new ways of handling old problems. This trait can be measured via the Rorschach ink blot tests. The man who sees the details first, then the over-all picture, is an inductive thinker. The man who first sees a total integrated picture is

the more imaginative. If a man sees only the details, he is not a good bet for a top manager, Dr. Feinberg notes. He says the ideal is the man who first sees the whole picture, then breaks it down into its smaller parts.

13 The effective executive is purposeful. He works hard toward realistic ends. Says Mr. Shaw: The theoretical mind is oriented toward the accumulation of knowledge with little regard to how it can be applied. But businessmen must be selective in their search for new knowledge and must have the ability to convert the knowledge into a usable form.

14 The executive must have drive commensurate with his intelligence. If both his drive and intelligence are high, he's a good bet as a manager. If both drive and intelligence are low, he'll cause no one any trouble and will never become a good supervisor. If his intelligence is high, but his drive is low, he should be a good staff man. He'll likely be a good investigator and a good analyzer, but he'll frequently fail to make the necessary decision. "If drive is high and intelligence low, be careful," Dr. Feinberg warns. He says that is the kind of man who can "mess you up every time."

15 The competent manager does not have unrealistic goals. He doesn't use Cadillac merchandising to sell a Lloyd. Nor will he make plans for a $3 million year on a $2 million budget. He considers his aspirations in the light of possibilities for attainment.

16 An executive must use his energy constructively, says Dr. Balinsky. He must be the opposite of Don Quixote. He must learn to direct his energy toward the accomplishment of a specific goal.

17 An executive's interests should be in line with his work. Every man needs knowledge in many areas, but he doesn't have to be interested in all of those areas. The top executive should have a great interest in economics, says Dr. Feinberg. He should never become set in his ways, should always be open to new interests and experiences. But his prime interests should be related to his work.

18 Says Dr. Balinsky: "The candidate for an executive post should show evidence of broader interests than the average man. He might, for example, follow literary or scientific pursuits. Of course, these must be side interests of an otherwise practical manager. The narrow executive is too likely to go in one direction all the time. The man with broad interests will be better equipped to feel all of the different pulses and arrive at a better decision."

19 Outstanding executives "are lifters, not leaners," says Dr. Feinberg. He says that they recognize their responsibility to people who depend upon them. That's why the good executive should have a high sense of responsibility toward his family.

20 To be effective, a manager must have no special, pressing problems with his wife. Or if he has marital difficulties, he should be able to shake them so they won't interfere with his productivity. If he has many domestic problems, he'll have too little energy left for his job. And he'll be less apt to concentrate as completely on the more distasteful chores that go with his position.

21 He must be open-minded and able to see himself clearly. That's essential for personal as well as executive growth, says Mr. Shaw. When a man's image of himself gets distorted out of context with reality, he's vulnerable to all sorts of maladies. He's likely to fail to act on a new idea that could be highly profitable for his company simply because he has some bias against it or its proponents. The topflight manager recognizes his strengths and weaknesses and surrounds himself with men who are strong in the areas in which he is weak.

22 He must be able to discuss personal matters with others. Reason: Talking with someone else about a personal problem can give you a new insight into the problem. Result: You'll be able to analyze it more objectively and act upon it more decisively. The discussion will also bring you some feedback about your proposed solution to the problem.

23 "The good executive dare not have any special fears or heightened anxieties that interfere with his social facility and work performance," says Dr. Balinsky. He points out that some persons have intermittent depressions of an extreme nature that seriously detract from their ability to aggressively attack their work. Personal problems, such as alcoholism, also fall in this category.

24 "Good executives possess no highly defensive or rigid habit patterns," says Dr. Feinberg. He points out that many poor executives do have those problems. He offers two simple illustrations: The man who wants to eat lunch in the same place every day. The fellow who panics when a picture on his office wall is slightly askew.

25 To be successful, a manager must have "the appropriate combination of dependent and independent strivings," says Dr. Balinsky. This is principally being willing to act independently in areas where he is strong and being willing to call on others for advice and counsel in areas where he is weak or untrained.

26 The good executive is sincerely interested in helping his subordinates solve their problems, but "he shouldn't be too tender," says Dr. Feinberg. He cites a parallel in the old German soldier who pointed out that "a good general has to resist the sensuous aspects of the battlefield." Without this trait, the executive may fail to fire the man who does not contribute to the good of the company. "You must be willing to make the moves that are essential for the over-all good even if it hurts some people," says Mr. Shaw.

27 Finally, the executive candidate must have no serious health problems, the psychologists point out.

The degree to which a man has each of the above traits can be found through testing procedures, the psychologists insist. They point out that testing is not a panacea for all selection problems. They say it should be considered as a way of improving your batting average. It should supplement, but never replace, management's use of judgment in the selection process.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

West Takes Two Routes to Growth

"THERE IS no doubt that the outlook for the industrial countries of the Western world is good," stated Richard Miles, director, economic affairs, British Information Services in the U. S., at the 45th annual meeting of the National Industrial Conference Board in New York.

"But far from engendering 'boom' conditions," observed Mr. Miles, "many countries in the coming year will be weighing the advantages of price stabilization and a balanced foreign exchange position over the advantages of growth for growth's sake."

The decisions to be taken in Europe are different from those facing the U. S., said the economist. Europe's problems are usually those of a labor shortage, an enormous backlog of unsatisfied demand for both capital and consumer goods, and a tendency for consumption to outrun available supplies.

"This is a factor in the big excess of imports over exports and the consequent balance of payments problems," commented Mr. Miles. It has called for a degree of restrictions on credit and consuming power in the leading European countries. The restraints are likely to continue, he said.

Forecast Mr. Miles: "We can look for steady growth on both sides of the Atlantic. But policies are likely to pursue contrary courses in the coming year or so. The U. S. will be seeking new stimuli; Europe will be holding in check the factors of an inflationary boom."

● **MANY COUNTRIES NEED HELP**—Mr. Miles does not believe the outlook is as good for the less developed countries, those usually described as primary producers or "one crop" economies. "Short term improvements in their earnings should not be allowed to conceal the fact that for many commodities prices are back to 1950 levels," he cautioned. "Vast potential markets are at risk for lack of purchasing power."

The industrial countries of the West must make strenuous efforts to solve the problem, he warned. "If the 'revolution of rising expectations' is too long frustrated, the prospects of the businessman who hopes to market his products abroad will be as dim as the political outlook for these countries."

One aid: Government and private investment. At the same time, commented Mr. Miles, we must not close our doors to the products of these countries nor rule out price stabilization plans for some commodities.

Split Called Stepping Stone to Unity

While the split between the six countries of the European Economic Community and the seven members of the European Free Trade Association is causing concern in some quarters, Prof. Walter Hallstein, president of the EEC Commission, believes it is not really a "split," but a step toward further consolidation and, eventually, a United States of Europe. Pressure is building up inside each group for an agreement.

The big stumbling block to sealing the split is the EFTA's Britain. She says she is ready to negotiate, but refuses unconditional agreement to the Treaty of Rome, which set up the EEC. Such an agreement, explain the English, would mean that any trading privileges Britain gives to colonies and ex-colonies will be carried over into the Common Market arrangement. If Britain were to sign the Treaty of Rome without amendment, she would have to give such trading privileges to the colonies and ex-colonies of France, while denying to her colonial dependencies and commonwealth partners their existing trade privileges. Presently, nearly all commonwealth goods enter Britain dutyfree.

Meanwhile, each group is making significant progress toward its goals. Tariffs are coming down ahead of schedule. Finland has become associated with the EFTA and Greece with the EEC. Neither is a full member, but each will take part in most of the tariff reductions required of members.

Japan's Economy Enters Test Period

"The pessimistic prognostications about the Japanese economy have been proved wrong year after year," Reed J. Irvine, chief, Far Eastern Section, Division of International Finance of the Federal Reserve System, told the NICB meeting. "Nevertheless, we should not assume that Japan has solved the problem of the business cycle," commented Mr. Irvine. "We are now in the tesing period. The boom seemed to be losing steam for a few months. Industrial activity rose only a little more than 1 per cent between November, 1960, and February of this year. But preliminary adjusted figures for March show a whopping 4 per cent increase over February."

"There is no evidence now that domestic demand is likely to be a limiting factor in the economy's growth," observed Mr. Irvine. "But there has been some evidence in recent months that foreign demand for Japanese goods may not keep up with output. The trade deficit in the first four months of this year (seasonally adjusted) exceeded $1 billion." Although foreign exchange reserves rose by more than $200 million from December through April, "Japan will encounter balance of payments problems troubles if output continues its rapid rise and exports fail to keep pace," said Mr. Irvine.

Meanwhile, Japan continues liberalizing her import restrictions.

GLX-W COLUMBIUM-TREATED CARBON STEEL CUTS DEAD WEIGHT 10% IN NEW

VERSATILITY...
That's the Beauty of Steel

Bringing important new economies to rail shipment of automobiles, this new tri-level auto carrier holds twelve standard cars or mixed loads of 14 standards and compacts. Capacity is increased up to 75%. A unique system of hydraulically positioning the vehicles on three levels gives a clearance of only 16 feet 8 inches, permits use in areas formerly limited to bi-level unit operation because of clearance requirements. ◆ Key feature of the Multi-Car Carrier is the movable decks on which the cars ride. Made of GLX-W columbium-treated steel, the decks are raised and lowered by built-in hydraulic lifts, actuated by a portable power unit. Here light weight was essential, in order to reduce the operating power requirements. Yet great strength was necessary, too, to support the payload. Finally, design of the decks called for eight bends in each section. So formability was also a must. ◆ GLX-W met and exceeded all these requirements. It gives 50-100% greater strength than mild carbon steel, so builder Whitehead and Kales could get the required strength with less weight. Deck operating units need less power,

Great Lakes Steel is a Division of

STEEL

Multi-Car Carrier built by Whitehead and Kales for Multi-Car Corporation, Detroit, Michigan

TRI-LEVEL AUTO CARRIER

and total weight is reduced approximately 5,000 pounds or 10%. Production is more economical, too, because the ductility and formability of GLX-W permits four of the bends in the deck to be performed in one press operation. ◆ The GLX-W series of high-strength steels consists of fine-grained, semi-killed mild carbon steels, treated with varying amounts of columbium. The high strength of GLX-W permits designers to reduce the amount of steel and effect considerable cost savings when replacing mild carbon steel. GLX-W steels have a low carbon content and are readily weldable and formable. GLX-W steels are available at four minimum yield strength levels: 45,000, 50,000, 55,000 and 60,000 p.s.i. and in sheets, plates and bars. For complete technical information, write Great Lakes Steel Corporation, Product Development, Dept. SM-9, P. O. Box 7310, Detroit 2, Michigan.

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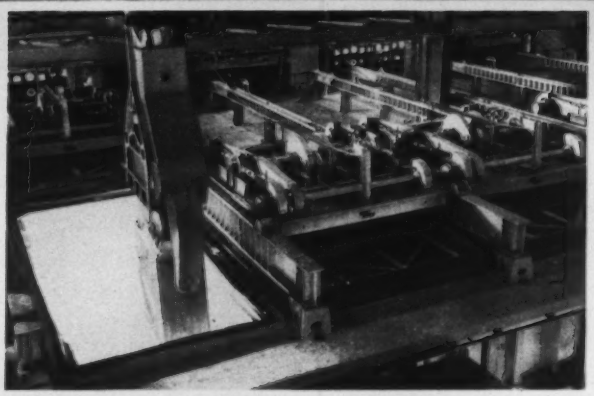

Lukens Steel Co.'s battery of Salem-Brosius pits.

Soaking Pits by Salem-Brosius at Acme Steel Co.

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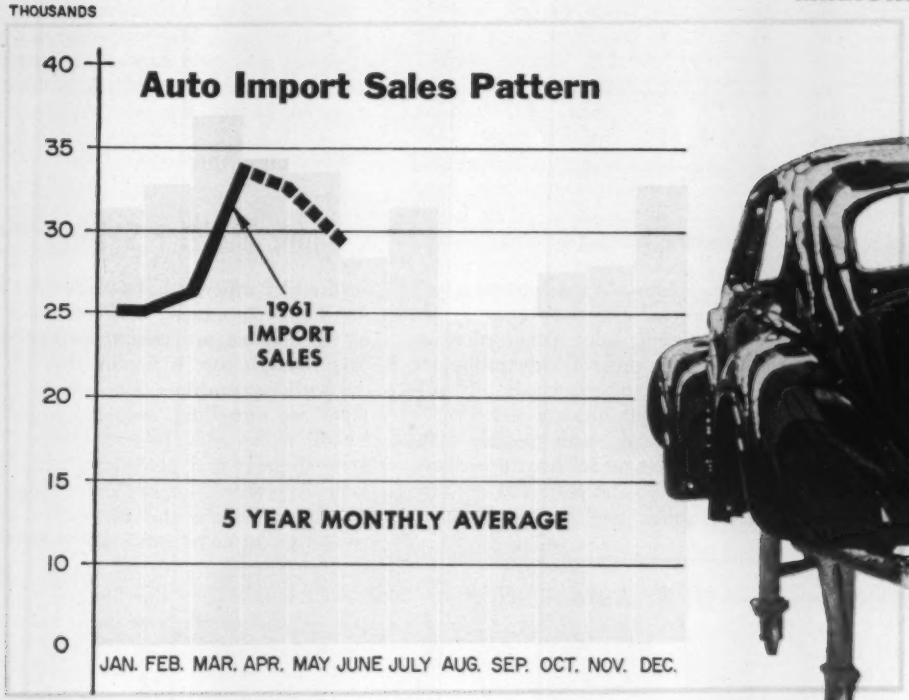

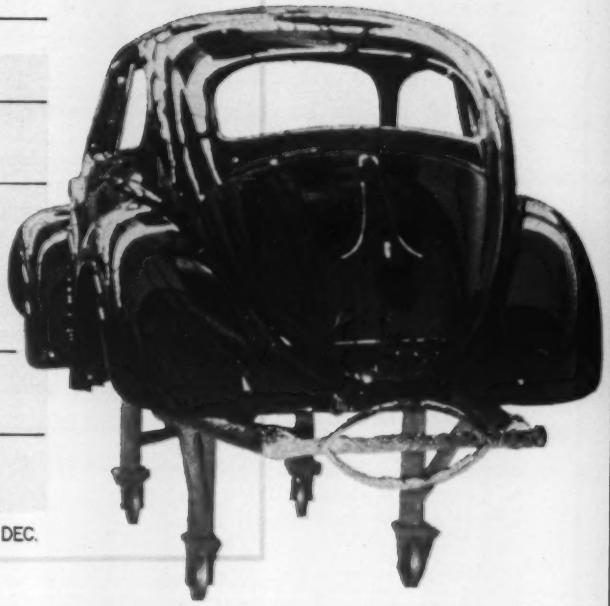

Source: Commerce Department.

Have Import Sales Peaked Out?

WHEN FOREIGN CAR sales in the U. S. jumped 27 per cent (March vs. February) the question arose: "Are foreign offerings headed for a revival?"

The increase follows the historical pattern of the five-year monthly averages (see chart). And it probably wasn't continued in April. Spot reports on May sales indicate the import registrations are running at less than 30,000 a month. Dealer stocks stand at 70,000, some 10,000 less than last year.

So industry estimates of 400,000 imports sales this year still look good. That will give them about 6.5 per cent of the market, and most of Detroit's economists figure they'll maintain that much penetration for several years. Last year, foreign cars took 7.6 per cent of sales.

Here are the top ten imports. They are ranked on the basis of total shipments into this country since 1946 including the first quarter of 1961:

Volkswagen	542,541
Renault	224,068
English Ford	130,871
Hillman	89,400
Fiat	84,198
MG	82,299
Opel	81,946
Simca	76,118
Metropolitan	66,389
Triumph	65,858

Volkswagen is the only car to show a gain over last year and is accounting for slightly less than half the import registrations. The German firm has sold more than 60,000 cars in this country since January, but it is running into some trouble with its trucks. Carl Hahn, general manager, Volkswagen of America, last year predicted his firm would sell 40,000 trucks in this country in 1961. At that time, the monthly sales rate was 3000. But it has plummeted to less than 1500 because Ford and Chevrolet economy trucks are doing well. VW Transporter models are overstocked.

Outlook for 1961: VW will sell less than 20,000 trucks; all truck importers will sell less than 40,000 —about 20 per cent off 1960's pace.

• **More Models**—But the successful importers continue to press for sales. Fiat will be shipping the first samples of its 1300 series into New York next month. The car is on a 95 in. wheelbase and has a 72 hp en-

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gine, with 80 hp optional. Official prices have not been announced, but the car is expected to deliver for around $1800. The car may help Fiat continue its comeback among the imports. Its U. S. sales dropped 40 per cent (to 20,773 units) last year. Price cuts have helped. March registrations hit 1355, a 93 per cent hike over February's. That put Fiat in third place among the imports for the month. Renault is second with 3687 registrations.

In Canada, where tariff changes have been one of the reasons for pushing import sales almost 25 per cent below last year's, Volkswagen will try a new tactic. It plans to market its larger car, called the VW-155, in Canada starting this fall. The 155 is slightly larger than the regular VW. It's styled more along U. S. lines and will list in Canada for about $2500, a third more than the conventional car.

• **More Marketing**—This jockeying for position among foreign carmakers has led J. B. McWilliams, sales vice president, Mercedes-Benz Sales Inc., New York, to declare that few of the producers have really learned how to sell cars in this country. "It's a fast market and an overpowering one. Some of the companies have been afraid to make a real commitment, and I think it has caught up with them," he asserts.

That, apparently isn't true for the high priced Mercedes—it has moved into fourth place among the imports this year. Last year, it didn't rank in the top ten. With shipments to this country limited by the parent producer, Daimler-Benz, Mr. McWilliams feels safe in predicting M-B sales of a little more than 12,000 in 1961. The sales outlet is a subsidiary of Studebaker-Packard Corp. which has an information and product exchange tieup with Daimler.

• **More Parts**—In addition to cars, importers have been sending over steadily growing quantities of parts and repair equipment. The value of imported automotive parts rose from $51.4 million in '59 to $54.9 million last year. *Ward's Automotive Reports* says that at the same time car shipments declined 33 per cent in number and 30 per cent in dollar value. Even though the 15 German car brands account for 45 per cent of this import market. United Kingdom countries shipped in the most parts ($18 million against $17.7 million from Germany). That's because UK countries import 22 different makes of cars. All told, more than 50 different makes are being imported.

• **Fewer Jobs**—While imports aren't in high gear this year (the record, 10 per cent sales penetration in 1959), they are still accounting for U. S. jobs and materials. If this year's 400,000 imports were U. S. built, it would mean roughly $200 million in wages for hourly workers. It would mean at least 300,000 tons of flat rolled steel.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,242
April	446,740	582,909
4 Mo. Totals	1,634,941	2,585,139
May		611,226
June		613,147
July		434,377
August		305,527
September		407,685
October		617,816
November		597,132
December		522,239
Total		6,694,288

Week Ended	1961	1960
Apr. 22	124,459	144,886
Apr. 29	114,378	135,515
May 6	124,454	142,091
May 13	129,402	145,917
May 20	125,785†	154,755
May 27	128,000*	142,359

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Another view: At the International Auto Show, spokesmen for SAAB (Sweden) pointed out that imports have created jobs in this country. It's true that more than 12,000 dealers handle imported cars, but most of them are tied in with domestic makes. Only a handful of repair shops specialize in servicing the foreign cars.

It's estimated that up to 15 per cent of the steel we export goes into automobiles built outside this country.

But foreign carbuilders have made a contribution: They have greatly expanded their own markets, making them more attractive to U. S. builders. World-wide car sales (excluding U. S.) are expected to top 6 million units this year.

Ceramic Muffler Selling

Rambler reports that 60 per cent of the replacement mufflers sold by its dealers are ceramic coated, even though cost is double that of conventional mufflers. Ceramic tailpipes are outselling uncoated units by 40 to 1, adds John S. Krider, general parts and accessories manager, American Motors Corp. New Ramblers feature the ceramic exhaust system at no extra cost to the car buyer.

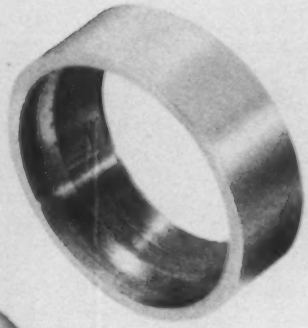
Mr. Krider says the lifetime expectancy of the ceramic units compares with an average life of 18,000 miles for a carbon steel muffler and 34,000 miles for an aluminized muffler. The replacement jobs are guaranteed for life too. The warranty covers both parts and labor. Mr. Krider figures the annual replacement market totals about 25 million mufflers and tailpipes—worth $500 million.

Delco Offers Air Spring

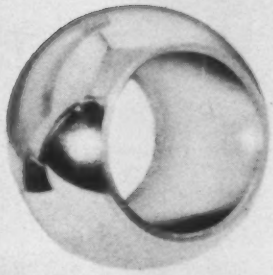
Looking for an extra lift with heavy loads? Delco Products Div., General Motors Corp., announces a rear shock absorber with a built-in air spring so it can be adjusted for extra loads on the rear of the car.

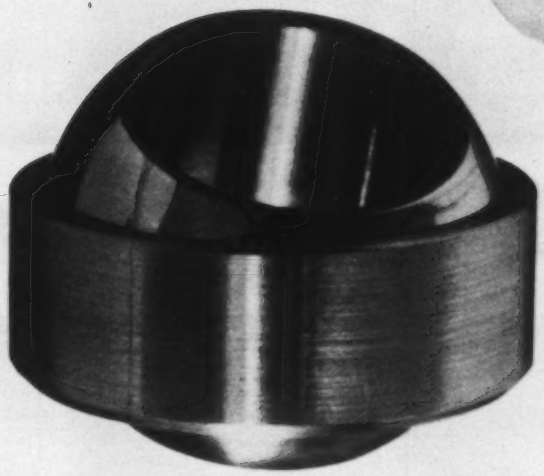
The device is really a shock absorber with a cylindrical air spring around its middle. Goodyear Tire & Rubber Co. engineers who developed the system for GM call the air spring a rolling lobe. They say it works something like trying to poke your finger into a balloon. The more air there is in the balloon, the harder it is to push into it.

In using this load leveling device, you inject air into the lobe by using an air valve in the trunk of the car. For normal driving, you let the air out. A crossover air tube between the rear shocks keeps them under equal pressure.



minute particles of lead...





improve surface finish

On these center aligning balls used in automotive universal joints, CHARLESTON METAL PRODUCTS switched from A.I.S.I. 52100 to the same grade of steel *leaded*.* They now report improved surface finish . . . a 15% increase in tool life . . . more uniform tolerances in finished parts. They also note that wear and shock resistance are not affected and uniform high hardness (RC 62-63) is maintained. Distortion remains at a minimum.

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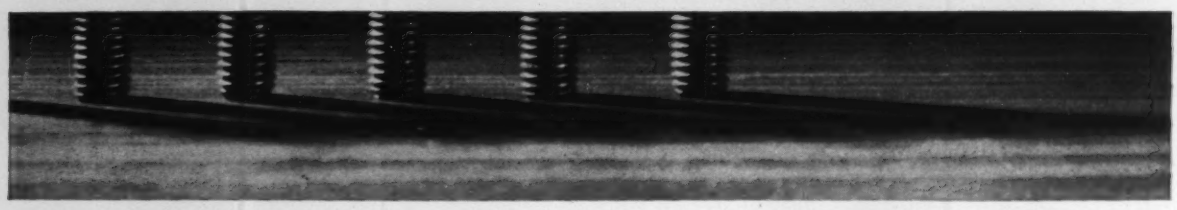

Fastener survey of blower units by RB&W points out where use of standard hex screws cuts costs, but not quality

In making a survey of a well-known manufacturer's fastening operations, the RB&W man found that alloy socket head screws were used extensively in large blower units.

But he found no genuine engineering need – the alloy's strength wasn't being utilized. And he found no production need – there was no tight spacing situation that required internal wrenching. Nor was there even an *appearance* need – screws weren't being installed in countersunk holes for a flush fit.

So there was no purchasing need, either. Why pay the premium cost for alloy fasteners? He recommended switching to *standard* high strength hex screws. The savings in fasteners per blower: 50 dollars. That's 50 dollars added to unit *profit* with no increase in price.

An RB&W Fastener Expert is no better than your engineers. He simply knows *what* to look for. Why not let him search for savings with one of *your* engineers? Maybe you're doing the best possible; but unless you're sure you're not wasting fastener dollars, it pays to consult Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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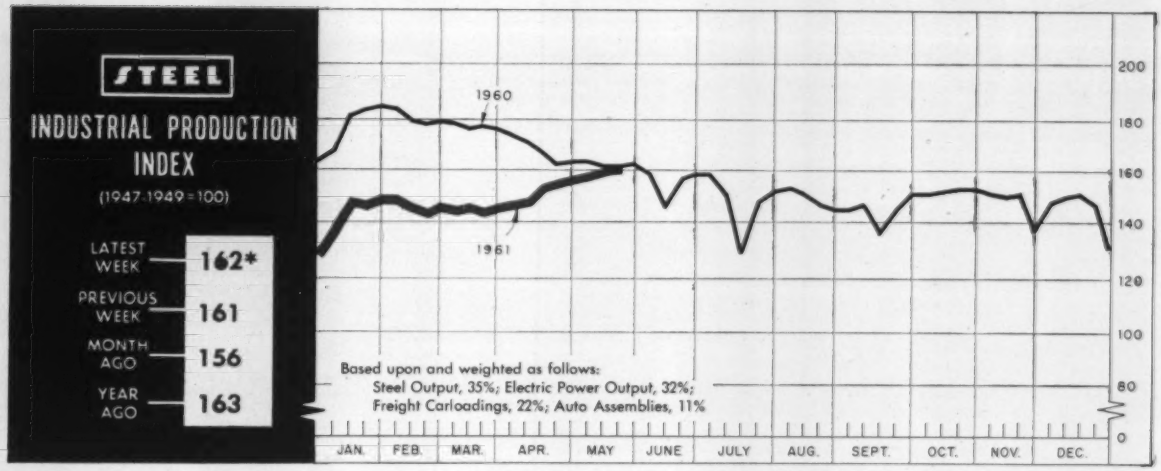

*Week ended May 20.

NICB Speakers See Steady Uptrend

OPTIMISM ran high at the National Industrial Conference Board's annual meeting. The recession died in the first quarter, and a panel of economists and businessmen buried it under predictions of steady improvement in the economy until at least the second quarter of 1962.

• **Two Slants on Recovery**—Martin Gainsbrugh, chief economist for the board, pointed out that because the recession was the shortest (nine months) and the shallowest (7.1 per cent from peak to trough), the recovery is starting from an unusually high level. "There are two schools of thought on the recovery," he stated. "One says the downtrend was mild, and the recovery will be just as slow. The economy will be back to the previous peak (111 per cent of 1957 average) by yearend. The other school says that if the recovery no more than matches the 1958 pattern, the Federal Reserve Board's production index will be 118 by yearend."

Turning to unemployment, Mr. Gainsbrugh felt one reason the figures look so high is that they include an unusually large amount of "secondary" workers—they entered the market when they began to fear that the primary wage earner might be laid off. He predicts a big withdrawal of this type worker as the economy comes back.

• **What's Wrong**—He said there are three general theories about what is wrong with the economy:

1. The business system has been developing structural slack over the last several years, slowing down the growth rate and boosting unemployment as a percentage of the work force. If the economy had continued to grow at the pace prevailing up to 1955, the gross national product would be $550 billion instead of $500 billion.

2. The economy is suffering from an "unduly mild expansion" from 1958 to 1960, which was brought on by restrictive monetary and fiscal policies. The steel strike obscured

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,080[1]	2,037	1,870
Electric Power Distributed (million kw-hr)	14,300[1]	14,278	13,468
Bituminous Coal Output (1000 tons)	7,420[1]	7,315	8,380
Crude Oil Production (daily avg—1000 bbl)	7,000[1]	7,013	6,864
Construction Volume (*ENR*—millions)	$410.7	$559.7	$498.0
Auto, Truck Output—U. S., Canada (*Ward's*)	160,005[1]	163,033	193,865
TRADE			
Freight Carloadings (1000 cars)	550[1]	551	637
Intercity Truck Tonnage (changes from year ago)	−2.8%	−0.8%	−3.6%
Business Failures (Dun & Bradstreet)	368	399	304
Currency in Circulation (millions)[2]	$32,081	$31,968	$31,774
Dept. Store Sales (changes from year ago)[2]	+17%	−10%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$31,501	$28,366	$28,366
Federal Gross Debt (billions)	$289.0	$288.1	$288.1
Bond Volume, NYSE (millions)	$38.0	$34.7	$32.4
Stocks Sales, NYSE (thousands of shares)	24,274	26,026	19,725
Loans & Investments (billions, adjusted)[3]	$111.3	$111.6	$102.7
U. S. Govt. Obligations Held (billions)[3]	$26.7	$26.8	$25.7
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	222.0	218 7	230.8
All Commodities[6]	119.1	119.1	119.8
Commodities Other than Farm & Foods[6]	127.9	127.8	128.4

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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costs

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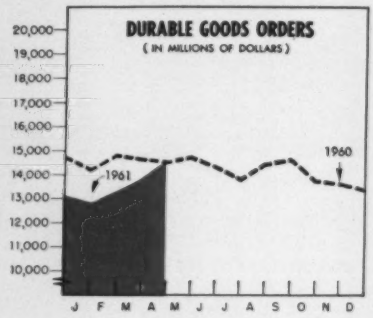
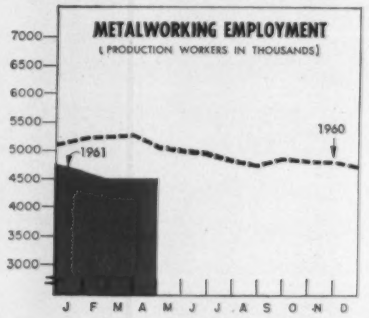
THE BUSINESS TREND





	New Orders* 1961	New Orders* 1960	Sales* 1961	Sales* 1960
Jan.	12,880	14,190	13.170	15,450
Feb.	13,360	14,800	13.320	15.670
Mar.	13,880†	14,640	13.710†	15,170
Apr.	14,500†	14,470	14,200†	15.000
May	.....	14,680	.....	15,060
June	.....	14,340	.....	14,880
July	.....	13,840	.....	14,730
Aug.	.....	14,410	.....	14,420
Sept.	.....	14,620	.....	14.410
Oct.	.....	13,740	.....	14.080
Nov.	.....	13.600	.....	13.810
Dec.	.....	13,220	.....	13,620

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1961, STEEL.

1960	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
Apr.	1,020	837	1,176	860	1,187
May	993	836	1,159	855	1,174
June	970	840	1,154	859	1,127
July	924	817	1,130	850	1,105
Aug.	910	819	1,112	861	1,036
Sept.	905	835	1,104	877	1,135
Oct.	891	834	1,087	839	1,149
Nov.	871	816	1,087	867	1,153
Dec.	851	794	1,081	844	1,125
1961					
Jan.	838	771	1,075	842	1,068
Feb.	829	755	1,077	835	1,012
Mar.	830	748	1,077	831	1,013
Apr.	835	757	1,084	825	994

U. S. Bureau of Labor Statistics.

the true nature of economic conditions that called for less restrictive measures. There is nothing wrong with the structure of the economy in this viewpoint.

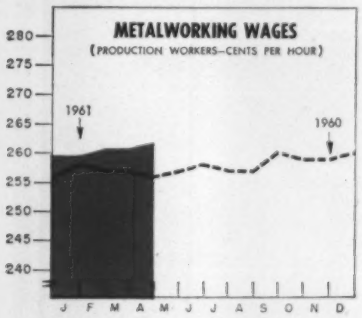
3. Mr. Gainsbrugh's theory is that we are in the "middle year" between the exaggerated growth of the postwar period—caused by artificial shortages—and the vigorous growth which lies ahead when family formations will be at an accelerated pace. During these middle years, the economy is undergoing some restructuring for more sound growth. Thus, 1961-62 will be good but not boom years. They will come in the mid-'60s.

• **Capital Spending Modest**—Louis J. Paradiso, assistant director-chief statistician, Office of Business Economics, Department of Commerce, told the conference that the comeback in capital equipment spending will be delayed until there is an upturn in profits—probably in the second quarter. The upturn in plant and equipment spending in the second half will be rather modest, he stated. Even if new orders begin to pick up significantly in the near future, a big change in expenditures won't come until late in the year.

• **The Influential Consumer**—William W. Tongue, economist, Jewel Tea Co. Inc., looks for the consumer to be one of the most positive forces in the economy in the next year. He declared that retail sales by next May should be running at a record monthly rate of $20 billion (vs. $17.8 billion in January, the low point for the recession). Retail sales of durable goods will be up almost 20 per cent by next spring to a record of $6.5 billion or more a month. Auto sales could well be 25 per cent above the current rate a year from now.

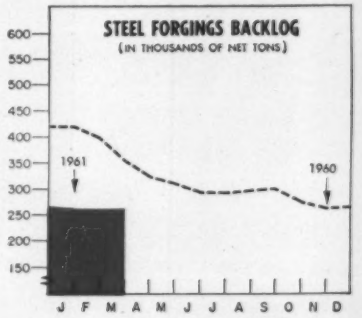
Retail sales of house furnishings, appliances, and building materials will depend on housing. Despite a dip in April, he feels that monthly housing starts will rise to an annual rate of 1.5 million units by late in the year.

• **Government Outlays Help** — A substantial increase in government spending over the next two years will also buoy the economy, stated Samuel M. Cohn, chief, fiscal analysis, Bureau of the Budget. Federal cash payments in fiscal 1961 will be $5.2 billion over those of fiscal 1960, and they will rise another $6.75 billion in the next fiscal year. The gains won't be re-



1960	Prim. Mtls.	Fab. Prod.	Ma-chinery	Elec. Mchy.	Trans. Equip.
Apr.	285	242	255	227	271
May	282	245	257	229	273
June	282	245	257	230	274
July	281	245	256	230	274
Aug.	280	246	256	230	275
Sept.	281	248	258	232	281
Oct.	281	248	258	232	281
Nov.	279	246	259	233	279
Dec.	283	247	260	233	279
1961					
Jan.	285	246	261	235	278
Feb.	285	247	261	235	278
Mar.	286	247	262	235	277
Apr.	287	248	262	236	278

U. S. Bureau of Labor Statistics.



	Shipments 1961	Shipments 1960	Unfilled Orders 1961	Unfilled Orders 1960
Jan.	95	123	266	420
Feb.	89	130	263	398
Mar.	96	138	263	356
Apr.	...	117	...	325
May	...	110	...	312
June	...	110	...	295
July	...	79	...	295
Aug.	...	88	...	299
Sept.	...	94	...	302
Oct.	...	97	...	277
Nov.	...	93	...	265
Dec.	...	90	...	268

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

stricted to antirecession spending. Some things, such as social security and the space program, grow naturally. However, the bulk of the spending will be felt in the February-June period because of the speedup of certain types of spending, such as veterans' and unemployment benefits and life insurance refunds.

Durable Goods Up Sharply

New orders and sales of durable goods in April rose sharply over the March pace (see chart, Page 58). Seasonally adjusted, each was up 4 per cent, says the Department of Commerce. Although sales were about 5 per cent under the year ago level, new orders were back to the 1960 pace.

The April rise occurred primarily in the steel and motor vehicle industries. Placement of defense contracts also contributed to the new order upturn.

Income Continues Advance

Personal income in April was at a seasonally adjusted rate of $410.5 billion. That's $500 million higher than it was in March and $4 billion above the February figure. The gains were in wages and salaries.

The increase was double the March pickup and was spread more widely among industries. Manufacturing alone accounted for more than half the over-all payroll advance, with durable and nondurable goods sharing equally in the gain.

GNP Firms in March

Gross national product held close to an annual rate of $500 billion in the first quarter, reports the Department of Commerce. It was $503.5 billion in the last quarter of 1960 and about $501 billion in the same period of last year. Demand firmed in March after declining in the preceding two months.

Personal consumption expenditures dipped $2 billion to a first quarter annual rate of $329 billion.

Investment in new plant and equipment continued to decline moderately as did outlays on residential construction. Inventory liquidation accelerated to a seasonally adjusted annual rate well above $4 billion compared with $3 billion in the fourth quarter of 1960.

Government purchases continued to increase and reached $104.5 billion.

Coming June 5 IN STEEL

What's the Pattern in Labor Settlements?

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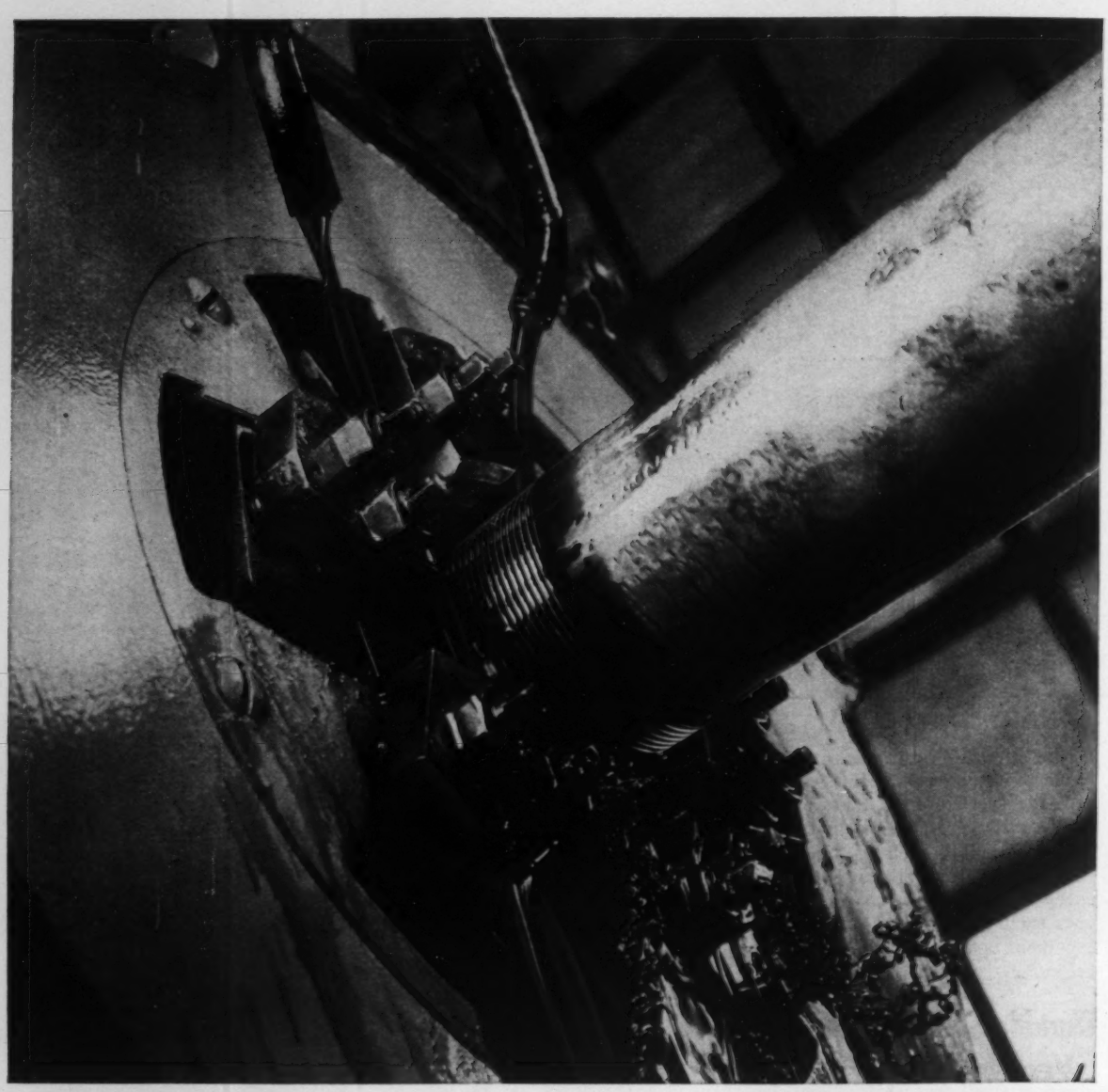
Next week, STEEL will report on the increases that have been granted to date, on the fringes that are developing, and on the patterns shaping up. The June 5 article will be just one in STEEL's continuing labor coverage for the year.



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Parker-Kalon president

L. R. MILLER
Trent Tube mfg. v. p.

ROBERT F. TREUER
joins Bunting Brass

RUSSELL K. BRANSCOM
Bethlehem Steel v. p.

S. S. Kahn was appointed president of **Parker-Kalon Div.**, Clifton, N. J., General American Transportation Corp. He succeeds **William T. Ylvisaker**, recently named executive assistant to the president of the parent company in Chicago. Mr. Kahn was senior vice president of Parker-Kalon.

Charles A. Barnes was made administrative vice president, a new post at **P. R. Mallory & Co. Inc.**, Indianapolis. **Dr. D. G. Wilson**, vice president-research, becomes vice president-research and engineering, effective June 1. **Dr. F. R. Hensel**, vice president-engineering, is retiring.

R. A. Olsen was named general manager, Wire & Cable Div., **Electric Autolite Co.** He directs operations at company plants in Port Huron, Mich., and Hazleton, Pa.

Donald K. Ballman was named vice president for marketing, purchasing, and distribution at **Dow Chemical Co.**, Midland, Mich., following administrative integration of sales, purchasing, distribution, and traffic functions.

Daniel J. Williams Jr. was named manager of the Cleveland plant of **Producto Corp.** He was vice president of Connecticut Tool & Engineering Co.

Louis E. Wengert was named general manager of **General Electric Co.'s** Direct Current Motor & Generator Dept. in Erie, Pa.

E. B. Schlenk was made manager, special products sales, for **Bucyrus-Erie Co.**, South Milwaukee, Wis.

L. R. Miller was made vice president-manufacturing, **Trent Tube Co.**, East Troy, Wis. He was works manager.

Robert F. Treuer was named general manager-Western operations, **Bunting Brass & Bronze Co.**, Toledo, Ohio. He was president of Atlas Brass Foundry, Los Angeles.

Robert O. Phillips was made general sales manager, **Disston Div.**, Pittsburgh, H. K. Porter Company Inc. **Robert W. Brady** was made products sales manager.

Daniel A. Llewellyn was named manager of **National Can Corp.'s** manufacturing plant at Marion, Ohio.

Thomas J. Watson Jr. was elected chairman of **International Business Machines Corp.**, New York. Continuing as chief executive officer, he is succeeded as president by **Albert L. Williams**, executive vice president.

James A. Miller, director of engineering, was appointed vice president-engineering research and development at **Motec Industries Inc.**, Hopkins, Minn. **David E. Thorn** was made materials engineer, Engineering & Research Div.

Stanford J. Barlett was made manager, Industrial Cleaning & Finishing Equipment Div., **Alvey-Ferguson Co.**, Cincinnati.

John M. Macy was made assistant to the vice president-engineering at **Dodge Mfg. Corp.**, Mishawaka, Ind.

Russell K. Branscom was appointed vice president, **Bethlehem Steel Co.**, Bethlehem, Pa., in charge of industrial and public relations. Former assistant vice president, he succeeds **Joseph M. Larkin**, retiring May 31.

J. Frederick Bechtel was elected executive vice president and general manager, **Clark Equipment International C. A.**, overseas subsidiary of Clark Equipment Co., Buchanan, Mich. He succeeds **Walter E. Schirmer**, recently elected executive vice president, parent firm.

S. Chetlin was named engineering manager of the Blairsville, Pa., metals plant of **Westinghouse Electric Corp.'s** Materials Manufacturing Dept. He succeeds **E. C. Bishop**, named technical co-ordinator, and reporting to **R. D. Rowley**, manager of the department.

Frank H. Post was made vice president-marketing, effective June 15, for **Robertshaw-Fulton Controls Co.**, Richmond, Va. He was vice president-general manager, Robertshaw Thermostat Div., in Western Pennsylvania.

Melvin Sumrall was made assistant superintendent of **Colorado Fuel & Iron Corp.'s** seamless tube mill, Pueblo, Colo., plant.

Atlas Steels Ltd., Welland, Ont., elected **Fletcher Peacock** vice president and general manager of its International Div.

Francis J. Hurst was appointed assistant sales manager, carbide and distributor products at **Pratt &**

CHAMP CARRY

W. IRVING OSBORNE JR.

Pullman Inc. chairman and president

RICHARD M. THORNTON

ROBERT J. KIECKHEFER JR.

Litho-Strip vice presidents

Whitney Co. Inc., West Hartford, Conn.

Pullman Inc., Chicago, elected **Champ Carry** chairman and chief executive officer, effective July 1. He is succeeded as president by **W. Irving Osborne Jr.**, who resigns as chairman of Cornell Paperboard Products Co., a division of St. Regis Paper Co.

W. B. Moen was appointed manager of **Air Reduction Sales Co.'s** Cryogenic Engineering Dept. in Plainfield, N. J.

C. E. Miller was made manager of manufacturing industries sales and engineering for **General Electric Co.**, Schenectady, N. Y.

C. L. French was made assistant superintendent, Basic Oxygen Steelmaking Dept., Fontana, Calif., plant, **Kaiser Steel Corp.**

Howard E. Everson was made director of research, **Diamond Alkali Co.**, Cleveland. He succeeds the late **Thornton F. Holder.**

Robert J. Burd was made assistant superintendent, Hot Strip Dept., Indiana Harbor, Ind., Works, **Youngstown Sheet & Tube Co.**

John Carge was made Midwest district office manager in Cleveland for **Brush Instruments Div.**, Clevite Corp.

Theodore B. Wilk was made sales manager, **A. F. Holden Co.**, Detroit.

Orlo I. Lemmer was made manager of metallurgical service at **Vanadium-Alloys Steel Co.**, Latrobe, Pa.

Litho-Strip Corp., Chicago, appointed **Richard M. Thornton** vice president-research and development; **Robert J. Kieckhefer Jr.** vice president-administrative matters and engineering.

John W. Stertzer was named Midwest regional product manager (Chicago) for **Denison Engineering Div.**, American Brake Shoe Co.

Robert M. Challender was elected vice president, **Wiesner-Rapp Co. Inc.**, Buffalo, and general manager of its Farnham Electronics and Honeycomb Divisions.

Evans T. Morton was made chief engineer of **Ben-Hur Mfg. Co.**, Milwaukee.

Curtis D. Hoffman was named manager, aluminum sales, for **Jessop Steel of California**, Santa Fe Springs, Calif.

J. E. Hooper was made manager of sheet and tin plate sales for **Bethlehem Steel Co.'s** Pacific Coast Div. He succeeds **R. F. Schumacher**, transferred to the New York district sales office.

Manuel V. Nodar was made product manager, stationary power tools for **DeWalt Inc.**, Lancaster, Pa. He was with Porter-Cable Machine Co.

Armco Div., Armco Steel Corp., Middletown, Ohio, named (effective June 1) **George H. McClure** assistant manager-sales administration. **Dwight L. Hagedorn** succeeds Mr. McClure as assistant manager - central sales. Effective July 1, **Frank R. Ditmars** becomes assistant manager, Western Sales; **Bert F. Carothers Jr.** assistant manager, Eastern sales.

Chicago Bridge & Iron Co., Chicago, elected **H. J. Clarke** and **S. C. Hamilton** senior vice presidents; **J. T. Horton** and **M. G. Mitchell** vice presidents.

Charles F. Wikoff was made manager of the new Quality Control Dept., Norwood, Ohio, Works, **Allis-Chalmers Mfg. Co. Joseph J. DeWindt** was made manager of production; **James H. Murphy** superintendent of maintenance, Norwood Works. **Kenneth R. Geist** was made general manager of a new Special Products Dept., Milwaukee.

Scully-Jones & Co., Chicago, formed a new **Scully-Jones International S. A.** in San Juan, Puerto Rico. **L. H. Skoglund Jr.** was appointed president; **Lloyd J. Hughlett** manager.

John J. Wallace was elected president and general manager, **Prab Conveyors Inc.**, Detroit.

W. L. Flanagan was made materiel manager, Glendale, Calif., branch, **Librascope Div.**, General Precision Inc.

Dr. Carl L. Kober was made director of advanced programs for the Denver Div. of **Martin Co.** He was a vice president of Avco Corp.

H. T. Larmore was made assistant general manager, Construction Machinery Div., Milwaukee, **Allis-Chalmers Mfg. Co.**

John D. Baker succeeds **J. H. Bolles**, retired, as director of reliability and

quality control at **Delco-Remy Div.**, Anderson, Ind., General Motors Corp.

George R. Lippert was made vice president-marketing, **Federal Mfg. & Eng. Corp.**, Garden City, N. Y., subsidiary of Victoreen Instrument Co. He was general manager of Victoreen's Communications Div., and previously was sales director at Victoreen's Chicago subsidiary, John E. Fast Co.

William F. Peschel was made manager, Induction Heating Equipment Div., **Olsen Mfg. Co.**, Royal Oak, Mich. He was district manager of Ajax Magnethermic Corp. **William M. Peterson** was made chief engineer. He was production manager and plant superintendent of Cargill-Detroit Corp.

William Gallagher was made plant industrial engineer; **Ray Clifford** assistant plant industrial engineer at **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp.

Robert J. Mullenbach was appointed general manager, **E-M Control Div.**, Minneapolis, Electric Machinery Mfg. Co. He was a consultant and general manager of the Mullenbach Div. of E-M in Los Angeles.

Edgar F. Howard was named president, Tool Div., **Vlchek Tool Co.**, Cleveland, subsidiary of Pendleton Tool Industries Inc. **Edward C. Koster** was elevated to chairman of Vlchek, and continues as president of the Plastics Div. He was president of Vlchek, which was acquired by Pendleton in 1960.

John B. Haertlein was made chief metallurgist, **Metals Disintegrating Co.**, Elizabeth, N. J., division of American-Marietta Co.

Edwin J. Newberg was named chief industrial engineer for **Warner Electric Brake & Clutch Co.**, Beloit, Wis.

GEORGE R. LIPPERT
Federal Mfg. & Eng. v. p.

WILLIAM F. PESCHEL
Olsen division manager

WILLIAM GALLAGHER
Weirton industrial eng.

ROBERT J. MULLENBACH
E-M Control Div. post

EDGAR F. HOWARD
Vlchek Tool Div. pres.

JOHN B. HAERTLEIN
Metals Disintegrating post

C. D. HITCHCOCK
Principal Mfg. v. p.

DAVID B. ORDEN
M&T Latin American post

MARK M. MILLER
joins Texas Foundries

C. D. Hitchcock was named a vice president of **Principal Mfg. Corp.**, Chicago. Formerly general sales manager, he continues national sales work in addition to new responsibilities which include product development and marketing.

Rollin M. Russell was elected executive vice president, **Acoustica Associates Inc.**, Los Angeles.

David B. Orden was named manager of Latin American operations for the International Div. of **Metal & Thermit Corp.**, New York.

Mark M. Miller joined **Texas Foundries Inc.**, Lufkin, Tex., as general manager in charge of domestic and international sales for the malleable, steel, ductile, and machining divisions.

OBITUARIES...

Hiland G. Batcheller, 75, chairman, **Allegheny Ludlum Steel Corp.**, Pittsburgh, died May 19.

Max F. Richter, vice president and manager, Steel Warehouse Div., **R. C. Mahon Co.**, Detroit, died May 18.

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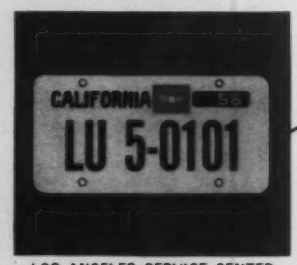

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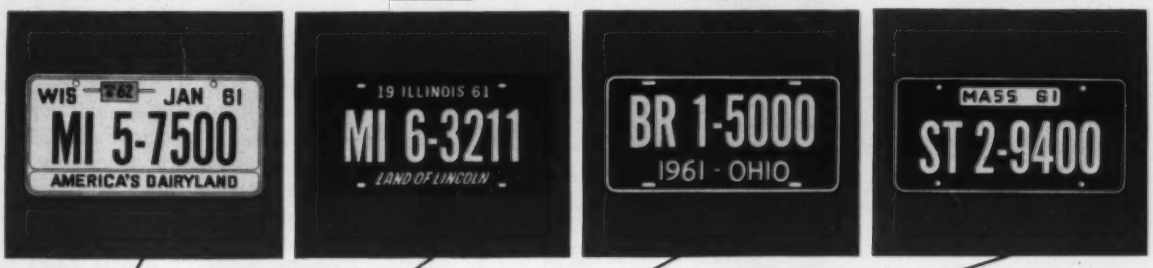

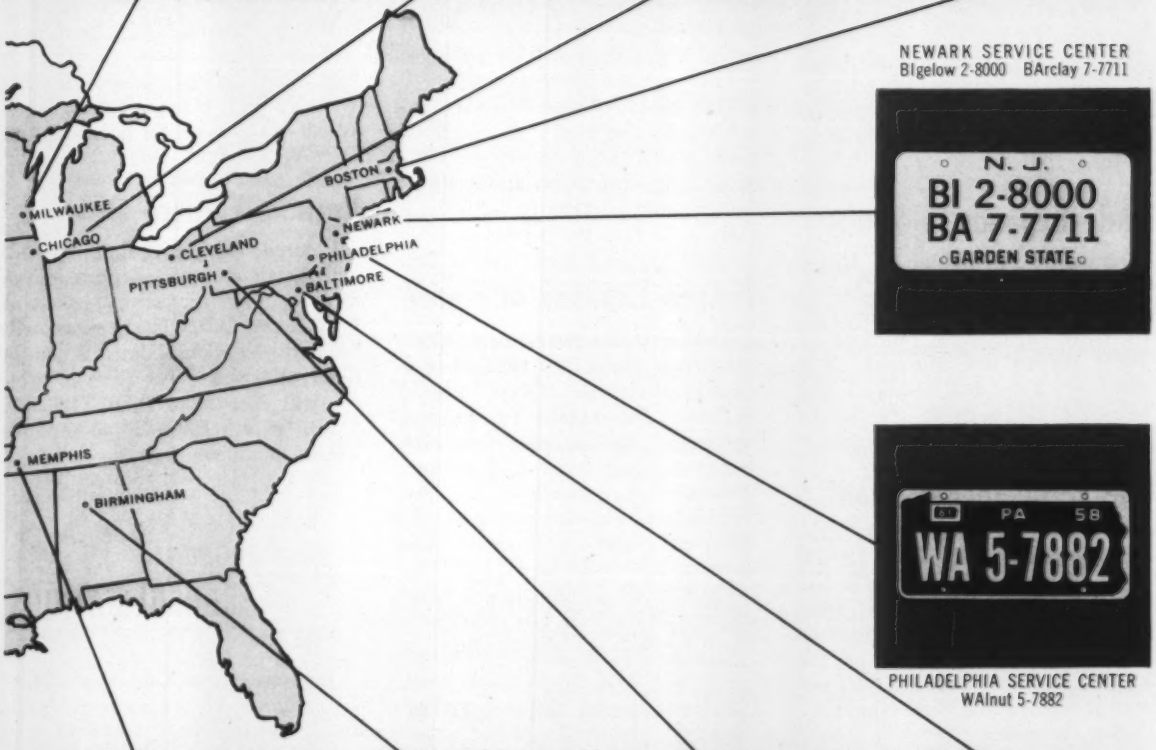

NEWARK SERVICE CENTER
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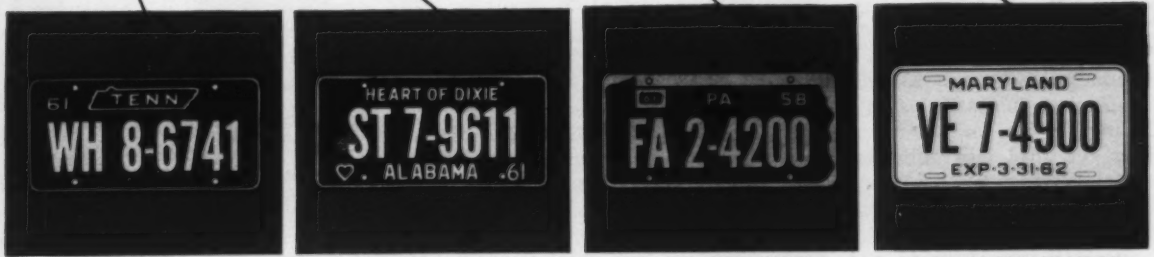
PHILADELPHIA SERVICE CENTER
WAlnut 5-7882



MEMPHIS SERVICE CENTER
WHitehall 8-6741

BIRMINGHAM SERVICE CENTER
STate 7-9611

PITTSBURGH SERVICE CENTER
FAirfax 2-4200

BALTIMORE SERVICE CENTER
VErnon 7-4900

Reynolds Metals Boosts Capacity of Alloy Plant

REYNOLDS METALS CO., Richmond, Va., has launched a $2.5 million expansion of the casthouse at its Sheffield, Ala., alloy plant.

The project will include installation of two large holding furnaces (80,000 lb capacity) which will be paired with two 100,000 lb melting furnaces, rated three times as fast as the plant's present units.

To house the new furnaces and related equipment, a 175 by 140 ft extension of the present casthouse will be built. It will be about six stories high.

Announcement of the expansion was made on the 20th anniversary of the tapping of the first Reynolds aluminum at its Listerhill, Ala., reduction plant. The Sheffield alloy plant rolled its first aluminum sheet in July, 1941.

Linde Expands in South

Linde Co., a division of Union Carbide Corp., New York, officially opened a plant at Huntsville, Ala. Its daily capacity is 140 tons of liquid oxygen and nitrogen. The plant serves the steel, chemical, and aerospace industries in the Southeast and as far west as Arkansas.

Erie Forge to Buy Plant

Erie Forge & Steel Corp., Erie, Pa., has offered $2,451,000 for the U. S. Navy property which it has been operating on a rental basis since World War II. The offer represents about 20 per cent of the original cost and less than 10 per cent of replacement cost, says H. C. Lackey, president.

Ships Equipment to Spain

Westinghouse Electric Corp., Pittsburgh, will supply $3 million in electrical equipment to power a cold rolling facility for Spain's newest iron and steel mill (Empresa Nacional Siderurgica S. A., Aviles). The cold rolling facility is expected to be in operation in late 1963 and is part of an integration program being carried out by the Spanish plant with the aid of the Export-Import Bank of Washington.

Included in the Westinghouse order are main drive motors, generators and controls for a four stand, tandem cold mill; a temper mill and pickling line; air circulating equipment; and electrostatic Precipitron air cleaners.

Holden Offers Lease Plan

A. F. Holden Co., Detroit, has appointed Nationwide Leasing Co., Chicago, to handle leasing contracts for its heat treating furnaces and accessories, on terms up to five years. "Our new lease arrangements with Nationwide will now enable many of our customers to modernize, expand, or improve their heat treating operations without taking working capital away from profit-producing activities," says A. F. Holden, president.

Timken Expands in France

Timken Roller Bearing Co., Canton, Ohio, opened its 182,000 sq ft plant at Colmar (Haut Rhin), France. Investment in ground, buildings, and equipment is estimated at more than $5.5 million. The new manufacturing facilities complement the original plant at Asnieres (Seine). Tapered roller bearings up to 25 in. OD will be manufactured. Ultimately, annual capacity of the new plant is expected to reach 8 million bearings.

Castle Opens New Center

A. M. Castle & Co., Chicago, formally opened its new steel and aluminum service center last week at 26800 Miles Rd., Bedford Heights, Ohio. The center covers 120,000 sq ft.

"Along with a large and diversified steel and aluminum inventory, the Cleveland area plant has modern and integrated equipment for services such as grinding, flame cutting, annealing, shearing, slitting, and other types of material cutting," says Raymond F. Bertram, district manager.

Aluminum mill products come from virtually all of Aluminum Co. of America's 20 coast-to-coast fabricating plants. The firm also distributes products of several major domestic steel producers.

Rotor Forms Subsidiary

Rotor Tool Co., Cleveland, manufacturer of portable air and high cycle tools, has formed a wholly owned subsidiary, Rotor Tool Co. of Canada Ltd., Toronto, Ont. The new firm is an affiliate of Cooper-Bessemer Corp. of Canada Ltd. Rotor Tool Co. is a subsidiary of Cooper-Bessemer Corp., Mt. Vernon, Ohio.

Bolens Closes Plant

Bolens Products Div., Food Machinery & Chemical Corp., San Jose, Calif., closed its South Milwaukee, Wis., plant and consolidated all manufacturing operations at Port Washington, Wis.

Vacuum Furnace Ordered

Eldorado Mining & Refining Ltd. will install a large, vacuum induction, melting furnace at its plant at Port Hope, Ont. The furnace will be built by Consolidated Vacuum Corp., Rochester, N. Y. The project will cost more than $100,000. It will permit Eldorado to produce almost pure uranium ingots.

CONSOLIDATIONS

Johnson Bronze Co., New Castle, Pa., acquired **Ferro Powdered Metals Inc.**, Salem, Ind., producer of powder metallurgy structural parts and shapes. The Powder Metallurgy Parts Div. of Johnson Bronze will be relocated and combined with Ferro at Salem.

American Datamatic Inc., Hicksville, N. Y., acquired the **Data Systems Div.**, Brooklyn, N. Y., of American Electronics Inc.

Ferro Corp., Cleveland, acquired full ownership of its affiliate, Procedes Ferro, Paris, France. The

purchase was made through its subsidiary, Ferro Enamels (Holland) N. V., Rotterdam, Holland.

VACATIONS

Boiler Div., Babcock & Wilcox Co., will suspend manufacturing operations for vacation periods in this order: Brunswick, Ga., June 17 through July 2; Wilmington, N. C., and Paris, Tex., June 24 through July 10; West Point, Miss., July 1 through July 17; Alliance, Ohio (Rush Street), and Barberton, Ohio, July 15 through July 30. The division's general office on Van Buren Avenue, Barberton, will accept shipments on orders which call for Van Buren Avenue delivery.

Milford Rivet & Machine Co. will close its plants at Milford, Conn., Hatboro, Pa., Elyria, Ohio, Aurora, Ill., and Norwalk, Calif., June 29 to July 17.

Waldes Kohinoor Inc., Long Island City, N. Y., will close for vacations from July 24 through Aug. 6. The firm's sales, order, and shipping departments will function on a limited basis. Token crews will be on duty.

Aetna Ball & Roller Bearing Co., Chicago, will close June 30 to July 24. Items slated for delivery during the vacation period will be shipped as scheduled.

NEW ADDRESSES

Disston Div., H. K. Porter Company Inc., Pittsburgh, moved its Chicago warehouse to 2567 Greenleaf Ave., Elk Grove, Ill. Products made by the division include saws, garden and power tools, steel tape rules, metal and wood cutting knives, and files.

Administrative functions of the **Oil Field Sales Dept., National Supply Div., Armco Steel Corp.**, have been moved to Dallas Federal Savings Building, Dallas. Executive offices of National Supply, its staff departments, and the general sales headquarters of the Tubular Dept. remain in Pittsburgh.

Head Steel Service Center Institute

OFFICERS elected at the 52nd annual convention in Washington are pictured above (left to right): President, R. J. Heggie, A. M. Castle & Co., Chicago; executive vice president, Robert G. Welch, Cleveland; chairman of the executive committee, Ralph W. Shaw Jr., A. R. Purdy Co. Inc., Lyndhurst, N. J.; treasurer, M. R. Lowenstine Jr., Central Steel & Wire Co., Chicago; vice president, N. F. Korhumel, Korhumel Steel & Aluminum Co., Evanston, Ill. Another vice president, J. H. Roberts Jr., Edgcomb Steel of New England Inc., Nashua, N. H., was not present.

ASSOCIATIONS

American Tin Trade Association elected these officers: President, W. D. Long Jr., A. Strauss & Co. Inc.; vice president, M. Foodim, Federated Metals Div., American Smelting & Refining Co.; vice president, A. S. Snyder, C. Tennant Sons & Co. of New York Inc.; and treasurer, J. J. Jennings, National Lead Co., all of New York.

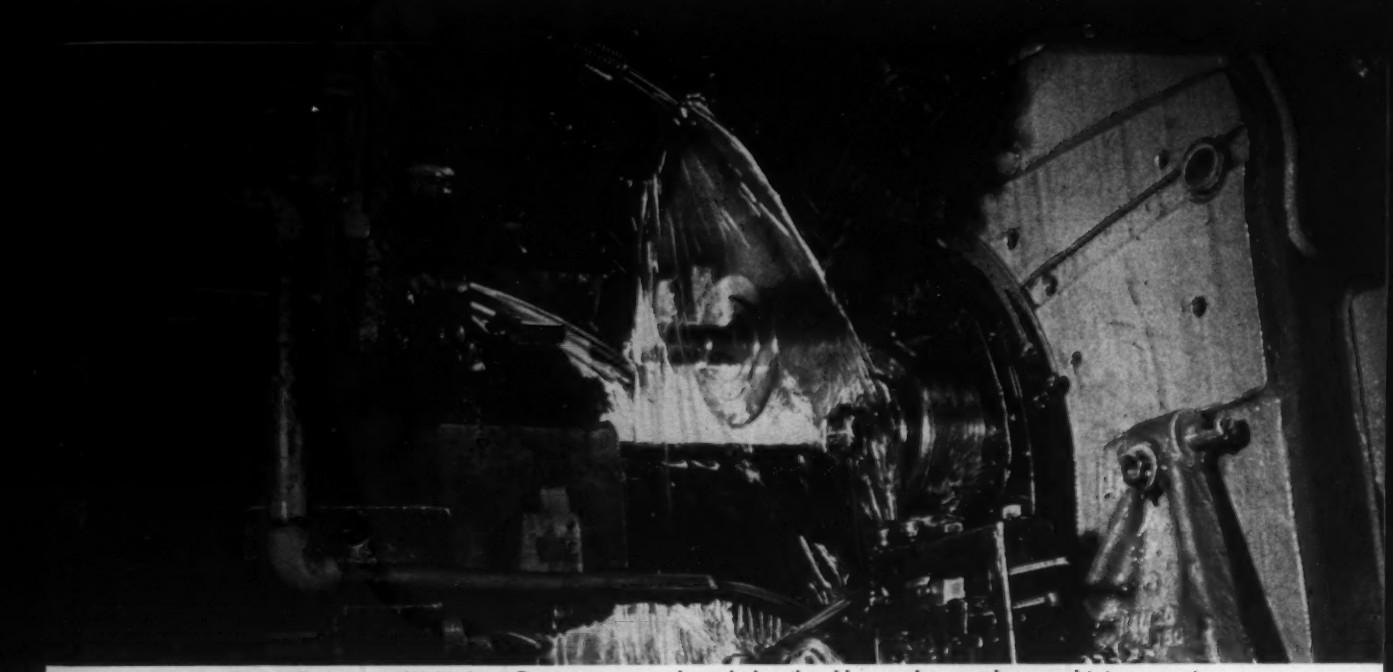
Copper & Brass Research Association, New York, elected these officers: President, G. P. Bakken, Chase Brass & Copper Co. Inc., Waterbury, Conn.; senior vice president, E. P. Dunlaevy, Phelps Dodge Copper Products Corp., New York; treasurer, F. L. Riggin Sr., Mueller Brass Co., Port Huron, Mich.; secretary, C. H. Pihl; and managing director, T. E. Veltfort. Vice presidents are: R. L. Allen, Bridgeport Brass Co., Bridgeport, Conn.; B. I. Ozer, Viking Copper Tube Co., Cleveland; P. W. Robson, Wolverine Tube Div., Allen Park, Mich., Calumet & Hecla Inc.; R. P. Winberg, Revere Copper & Brass Inc., New York; R. H. Lewin, Lewin-Mathes Co., St. Louis, a division of Cerro Corp.; J. F. Murray, Reading Tube Co., New York; C. Lee Smith, National Copper & Smelting Co., Cleveland; R. M. Stewart, Anaconda American Brass Co., Waterbury; S. T. Williams, Scovill Mfg. Co., Waterbury.

National Tool & Die Manufacturers Association, Cleveland, changed its name to National Tool, Die & Precision Machining Association. C. R. Bender is executive secretary.

NEW OFFICES

Kawasaki Steel Corp., Japan, opened a branch office at 26 Broadway, New York, N. Y., under the managership of Taisuke Usami. Kawasaki is one of the largest steel companies in Japan.

Chemical Construction Corp., New York, opened a branch office in the Gulf Oil Building, Pittsburgh, to handle regional sales for its Gas Scrubbing Div. Harry Richardson is office manager.



Garia oils are completely clear. Operators can see through the oil and keep a close watch on machining operation.

CUTTING:

Shell puts heavy-duty properties into transparent cutting oils that lengthen tool life three significant ways

Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life —even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

Read how Shell Garia Oils can reduce rejects, cut maintenance and overhead costs in your shop.

UNTIL RECENTLY, most heavy-duty cutting oils were opaque fluids which obscured the work.

Shell scientists took up the problem. They experimented with different formulae until they found the *exact combination* that retained the necessary properties—but did not seriously darken the oil.

Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

Cooling helps extend tool life, and helps assure a better finish on the work. Operating costs are lower too.

3. Garia Oils wet faster. They reach the tool point rapidly, cover newly exposed surfaces quickly.

Compact range

Today's range of Garia Oils covers every kind of metal cutting operation.

Result: you do not have to carry large cutting oil inventories. You can do more jobs with fewer Garia Oils.

For all the facts, see your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

ELECTRON BEAM ANNEALING—Coils of metal sheets are being processed through a vacuum furnace which utilizes an electron beam as the heat source. Coils wind and unwind in air, but they pass through air locks entering and leaving the vacuum chamber. The method has been applied to reactive metals like tantalum, columbium, and titanium. The developer, Temescal Metallurgical Corp., Berkeley, Calif., expects to find applications for more ordinary metals that must be processed in high temperatures and noncontaminating atmospheres.

BYPASSING THE INGOT—Russians claim to have a means of pressing molten metal directly into a kind of forging at a rate of five per minute. Main feature: Much less metal is required to shape finished parts.

TRIES URANIUM STEEL—Algoma Steel Corp. Ltd., Sault St. Marie, Ont., has poured its first full sized heat of uranium steel. It will be made into grinding balls to test "theoretical" improvements in resistance to fatigue, impact, and corrosion.

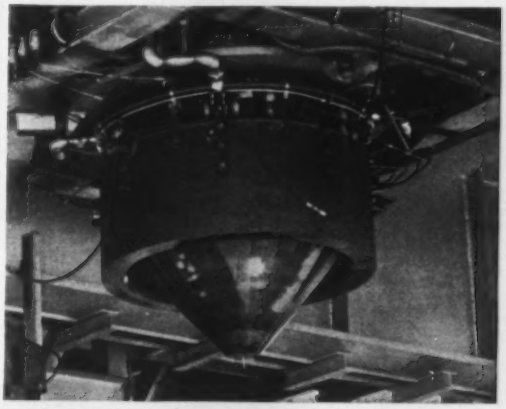
OIL-OXYGEN FOR OPEN HEARTHS—Lances in open hearth roofs that introduce a mixture of oil and oxygen have produced flame temperatures exceeding 5000° F, says Air Products Inc., Allentown, Pa. Tests at Granite City Steel Corp., Granite City, Ill., utilize 300 to 500 gallons of oil per hour and 90,000 to 150,000 cu ft of oxygen per hour.

ULTRASONIC SEALER—A wide variety of plastic films can be welded permanently with an ultrasonic device developed by Ultra Sonic Seal Inc., New York. No heat or chemicals are employed.

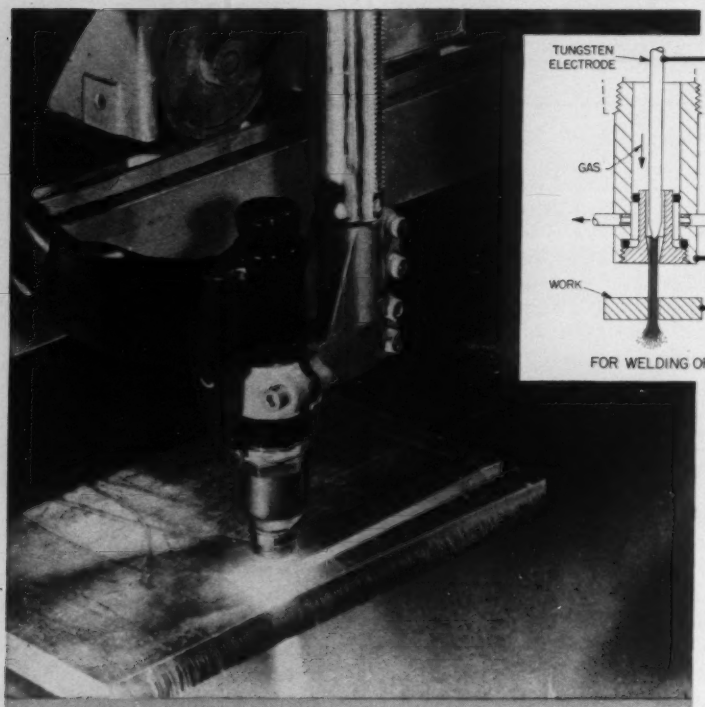
INVISIBLE BEARINGS—A new bearing prevents friction via magnetism. Separate layers of magnets shaped like thick washers are pressed inside the journal housing and over the shaft—magnetic repulsion maintains the bearing gap. The shaft is positioned laterally by magnetized end plates operating on the same principle, says N. V. Phillips' Gloeilampenfabriken, Eindhoven, Holland.

MEASURE BEARING CAGE FORCE—The forces working on the separator (cage) in roller and ball bearings can now be measured. The information gained is expected to lead to significant improvements in bearing design, says SKF Industries Inc., Philadelphia. Cage failure is one cause of bearing breakdowns.

BETTER ROCKET—An engineering headache—detonation waves in a rocket engine—is the key to a highly efficient rocket engine designed by a graduate student at the University of Michigan, Gary L. Cosens. His design reduces the size of large rocket engines by two thirds. A small model has already been tested.

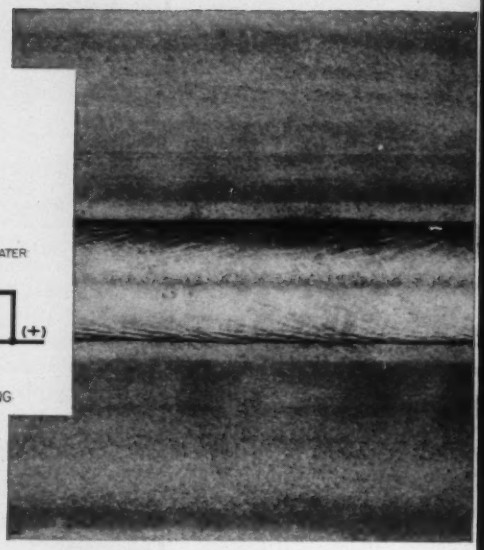


BETTER ROCKET NOZZLE—A new plug nozzle design for rocket engines is a significant breakthrough in bridging the gap between U. S. and Russian rocketry, claims the developer, General Electric Co., Schenectady, N. Y. The new engines are only half as long as a conventional bell shaped model. Combustion occurs in small, segmented cells around the circumference of a conical plug. The design eliminates many problems brought about when thrust increases are sought.

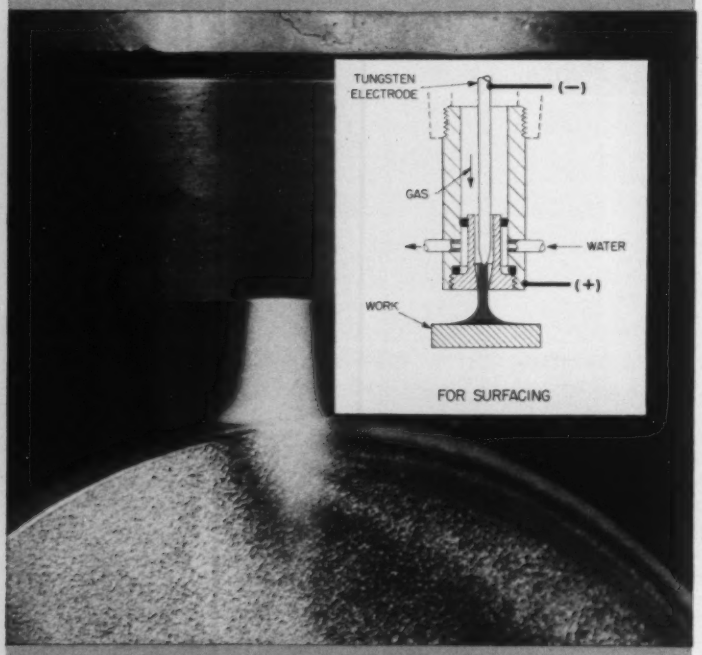


CUTTING

Linde's Plasmarc can cut ferrous and nonferrous metals at speeds up to 1000 ipm; 300 or less is more common since it leaves a smoother surface. Cut above is being made in stainless steel



WELDING



PLATING, SURFACING, or POWDER BUILDUP

In surfacing operation, plasma torch is laying down 1/8 in. thick bead of Stellite alloy on a 4 in. disc. Appearance of such surfaces is exceptionally smooth and is a true weld, not merely bonded particles

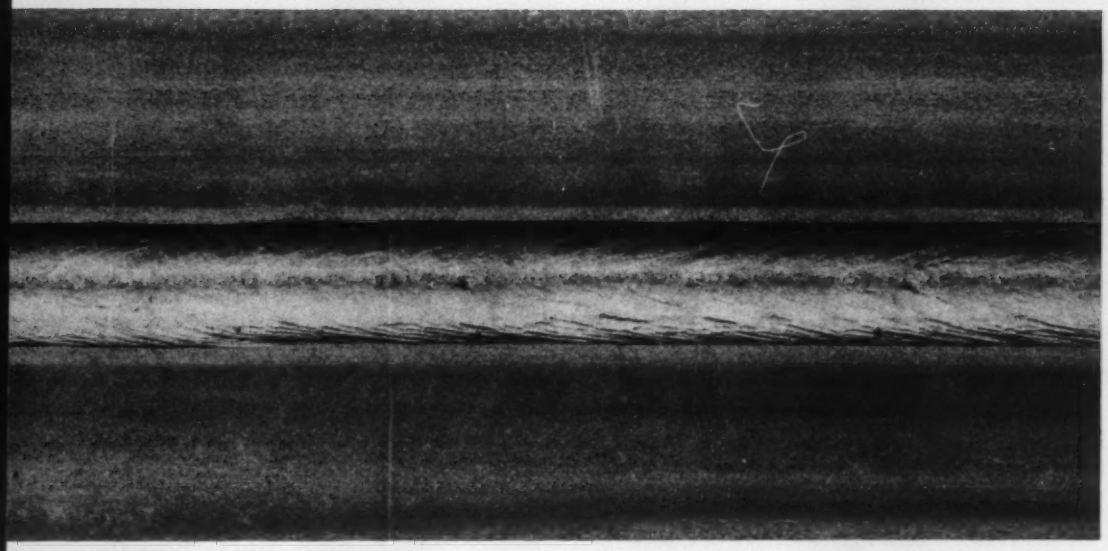
More than 1000 users,

Plasma Arcs

• A NEW BREED of gas welding —the plasma arc—is expected to get increasingly better billing over more conventional performers in the joining, cutting, plating, and surfacing of practically anything that melts without decomposing.

The reason: Its temperatures (up to 100,000° F) easily handle high melting point metals like tungsten, rhenium, or molybdenum, and the even higher melting ceramics, oxides, and carbides, says Linde Co., a division of Union Carbide Corp.

The technique is being employed extensively, claims Linde, to plate missile and rocket parts, to cut 4 or 5 in. ferrous and nonferrous metals at speeds up to 300 ipm (1000 ipm can be achieved), to lay down "skins" 0.010 in. thick on a wide variety of metals, and for welding all metals at speeds comparable



Here's a closeup of weld quality on stainless steel. Heat affected zone is said to be exceptionally narrow

new data, increasing need confirm that . . .

Set for Full Production Role

to those of standard Mig and Tig arcwelding processes.

Other uses include: Simulation of re-entry conditions for missiles, ion propulsion engine studies, high temperature chemical reactions, refractory crystal growing, high intensity light, and heat for extractive metallurgy and high temperature machining.

• Plasma torches are either the transferred or nontransferred arc types. The transferred type can put more heat into a workpiece. The other keeps more heat in the nozzle to melt powders introduced through the gas stream.

Almost any gas can form the plasma, states Linde, although nonoxidizing types like nitrogen, argon, or hydrogen are employed. In selecting one, heat transfer from the gas to the work is more important than temperature. For example, argon and hydrogen produce plasmas that fall within a similar temperature range, but hydrogen transfers more heat.

A plasma arc combines directional stability of a combustion flame and the high temperature of an electric arc. Temperature and length of the plasma can be controlled by varying the current, the flow or composition of the gas, or by modifying the orifice size. Velocities of thousands of feet per second and flames several feet long can be achieved with power inputs varying from a few to many million watts.

• Plasma plating has become important in applying refractory materials to missile and rocket parts.

Linde has a job shop which coats practically any inorganic solid on a variety of base materials. Coatings can be any thickness since layers can be applied without sacrificing mechanical strength. Examples: Tungsten overlays on graphite for rocket nozzles; fabrication of tungsten parts by buildups on disposable mandrels. Parts and coatings have a density of 90 per cent of a theoretical maximum, a rupture modulus of 50,000 psi, and a Young's modulus of 24 million psi. Those properties can be improved by heat treatment, claims Linde.

• Recent work has made it possible to cut stainless 5 in. thick. Greater power and gas flow almost eliminate dross adherence.

Considerable research at Linde has been aimed at cutting carbon

What Does Plasma Arc Cost?

Not much, if you consider these figures offered by Thermal Dynamics Corp., Lebanon, N. H.:

- On ¼ in. steel, plasma arc costs run about 10 per cent of those for oxyacetylene. For 2 in. thicknesses, it's about half as expensive.
- Stainless: Regular powdered iron cuts run 35 to 40 cents a foot for 1 in. thick stock. Plasma arcs will do the same job for 5 cents a foot.
- Aluminum: Cutting costs run from 1 cent per foot for ¼ in. stock to 3 cents for 2 in. material.

Such savings result from reduced gas consumption and greatly increased cutting speeds, says Thermal Dynamics. Quality of cut is improved because the operation is done under an inert gas with little heat penetrating the base metal. Components last a long time and can be replaced cheaply. The equipment is easy to operate.

steel. Plasma arc presently cuts faster than oxygen, but quality is not as good, the firm claims (see box above). Comparative studies are still underway.

Plasma arc cutting can be done at 1000 ipm, but speeds of 10 to 300 ipm are more likely. Tolerances are within 1/16 in. even on contours. The heat affected band on the kerf, only 0.040 in. deep, is easily washed out during welding.

• In surfacing, a thin coating can be fused to a metal base. Diffusion can be controlled at high speeds.

Overlays as thin as 0.010 in. made with a plasma arc are a true weld, fused to the workpiece, and are especially resistant to impact and high stresses, says Linde. Unlike metal spray coatings, dilution into the base metal can be varied 5 to 50 per cent. Porosity is practically nonexistent.

As the plasma arc torch moves along the seam, the metal melts and solidifies within an inert gas shield. Such welds have exceptionally good width-to-penetration ratios which vary little with the distance the torch is held from the work. Excellent depth control is said to form a uniform underbead on stainless and aluminum without backing. Sheet metals can be flange welded with good results. The high grade tolerances make it ideal for automated setups.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Faulty Sheets Classified By Logic Sorting Device

FASTER and more reliable sorting of sheets from coil processing lines is promised by a device available from Metal Industries Div., English Electric Co. Ltd., London.

Faults such as pinholes, off gage, and poor surface finish are detected during inspection of the strip. But the material can be sorted into grades only after it has been cut into sheets. The inspection information is stored and processed in standard, transistorized logic units, so it can be used for classification of sheets after the strip has passed through the shear.

Delay circuitry causes defect signals to arrive at the sorting mechanism at the same time as the faulty material. Normally, mechanical reject gates are employed, but more complex methods (such as overhead, magnetic conveyors with variable dropoff points for the piles) can be used.

Two of the sorters are to be installed soon in Welsh mills. One, at Abbey Works, Steel Co. of Wales Ltd., will be on a line that operates at 700 fpm. It will sort sheets 40 to 180 in. long into prime and reject categories. Two of the sorters at the Ebbw Vale Works of Richard Thomas & Baldwins Ltd. will be used on tin plate lines operating at 1000 fpm. They will classify sheets 18 to 42 in. long into material with pinholes, off gage material, other rejects, and prime material.

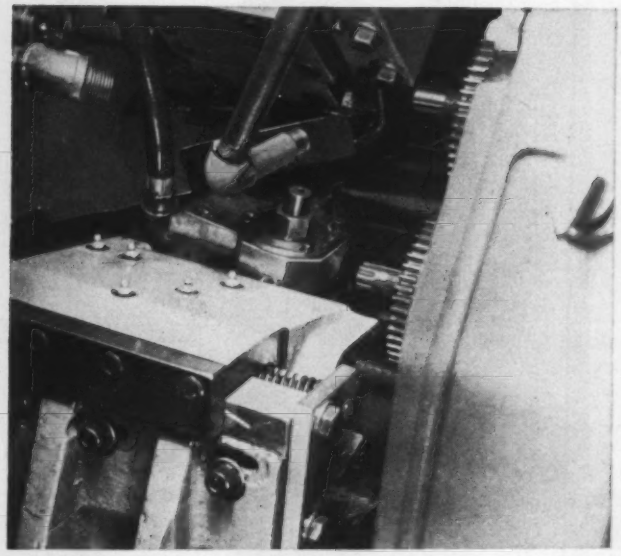
One of the sorting devices will also be installed in a South African steelworks.

Mill Used by Researchers

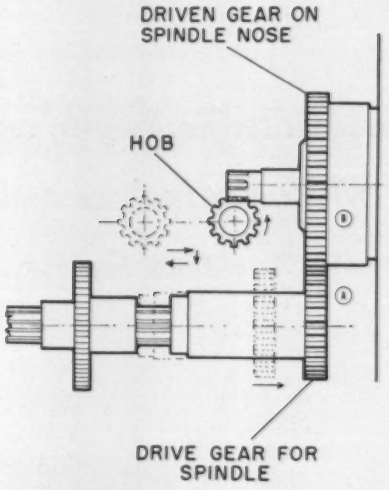
THE FORMING of materials will be studied on a 35 ton rolling mill at Carnegie Institute of Technology, Pittsburgh. The mill, which is a gift of Weirton Steel Co., Weirton, W. Va., a division of National Steel Corp., will be used by the Department of Mechanical Engineering.

Goals: Better understanding and eventual automation of the rolling process; rolling of materials that are not now processed on mills.

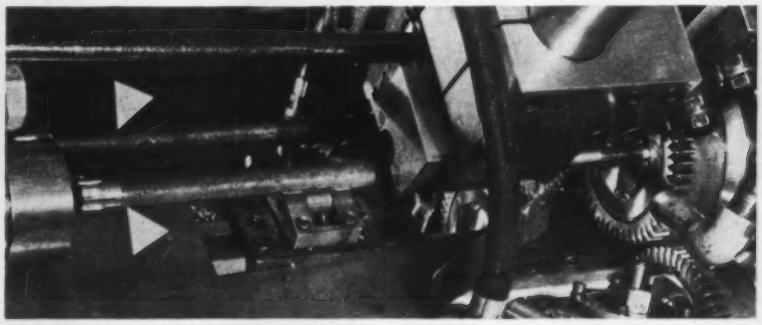
Splines Hobbed on Six Spindle Automatic



Special hobbing attachment . . .



Drives the work spindle . . .



To cut splines on these shafts

HOW MUCH does a secondary operation cost?

One company checked its parts and learned that such work on wringer rolls formerly required 82 per cent of the total machining time. A significant shortcut was made when the secondary spline hobbing operation was incorporated into the primary setup on a multiple spindle automatic bar machine.

• Use of a special attachment on the primary machining setup crops total machining time from 73 seconds to 27.9 seconds.

Originally, the wringer rolls were made by blanking the parts on an automatic bar machine. Spline hobbing was the second job, done on another machine. The cycle time on the automatic was 13 seconds. It took 60 seconds floor to floor for the spline hobbing.

Engineers at National Acme Co., Cleveland, tackled the problem of getting the splining operation worked into the setup of one of their 1¼ in. bar automatics. Spline hobbing is a perennial problem to builders of automatics. They can incorporate a host of other secondary operations on the machines (STEEL, July 25, 1960, p. 118), but when it comes to hobbing, the necessity for controlled, slow revolution of the spindle is a barrier.

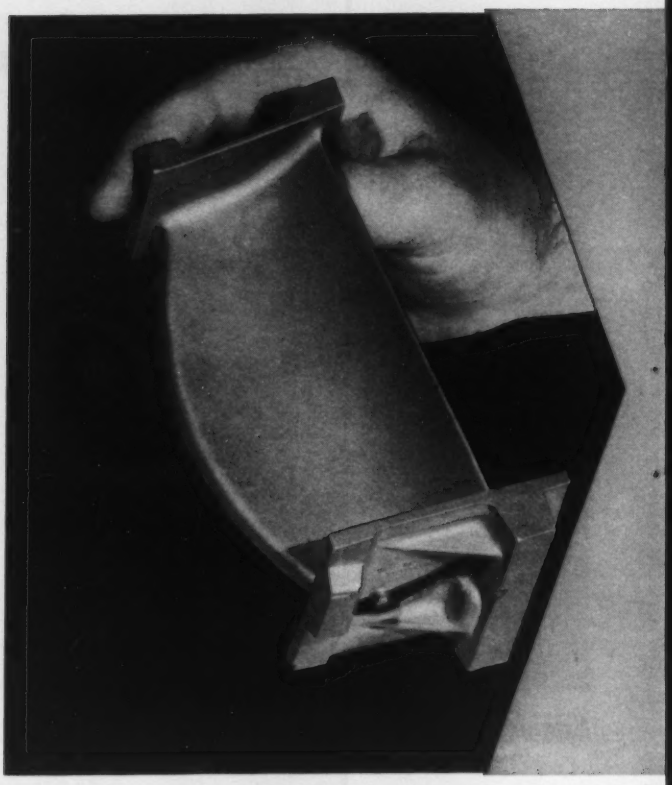
• The drive gear on the attachment supplies power to the machine spindle.

To get the required precise ratio between speed of the hob and that of the spindle, the spindle is stopped and immediately disengaged from its machine drive in the hobbing station. A gear on the attachment engages a gear on the spindle nose and rotates the spindle at the right speed.

The end of the workpiece is formed and shaved during the previous machine cycle. After the previous piece is cut off, the bar remains in place in the collet so the end gets maximum support during hobbing. After hobbing, the part is fed out to length.

The machine is a National Acme, 1¼ in., RA, six spindle automatic. In the change, the bar machine time was raised from 13 seconds to 27.9 seconds to include the hobbing time. But that increase wiped out the 45 seconds that used to be spent on the separate hobbing operation.

Now used for turbine buckets, superalloy WI-52 may find new applications because . . .



Research Adds to Service

• RESEARCH into the fine points of alloy composition and production can pay off for users, reports WaiMet Alloys Co., Dearborn, Mich., a division of Howe Sound Co. Results: At 1800° F, the stress rupture life of the superalloy WI-52 was improved 18 per cent, and its rupture elongation was increased by 160 per cent.

Better properties permit the design of lighter or smaller components than had been possible with the original material. It's used for jet turbine blades and vanes. Suggested uses include: Stationary and automotive gas turbine engine parts and high temperature parts for diesel engines.

Higher operating temperatures are one route to increased efficiency in heat engines. But the higher temperatures raise material requirements. In intermittent service, good thermal shock resistance should be coupled with good creep strength and high stress rupture life.

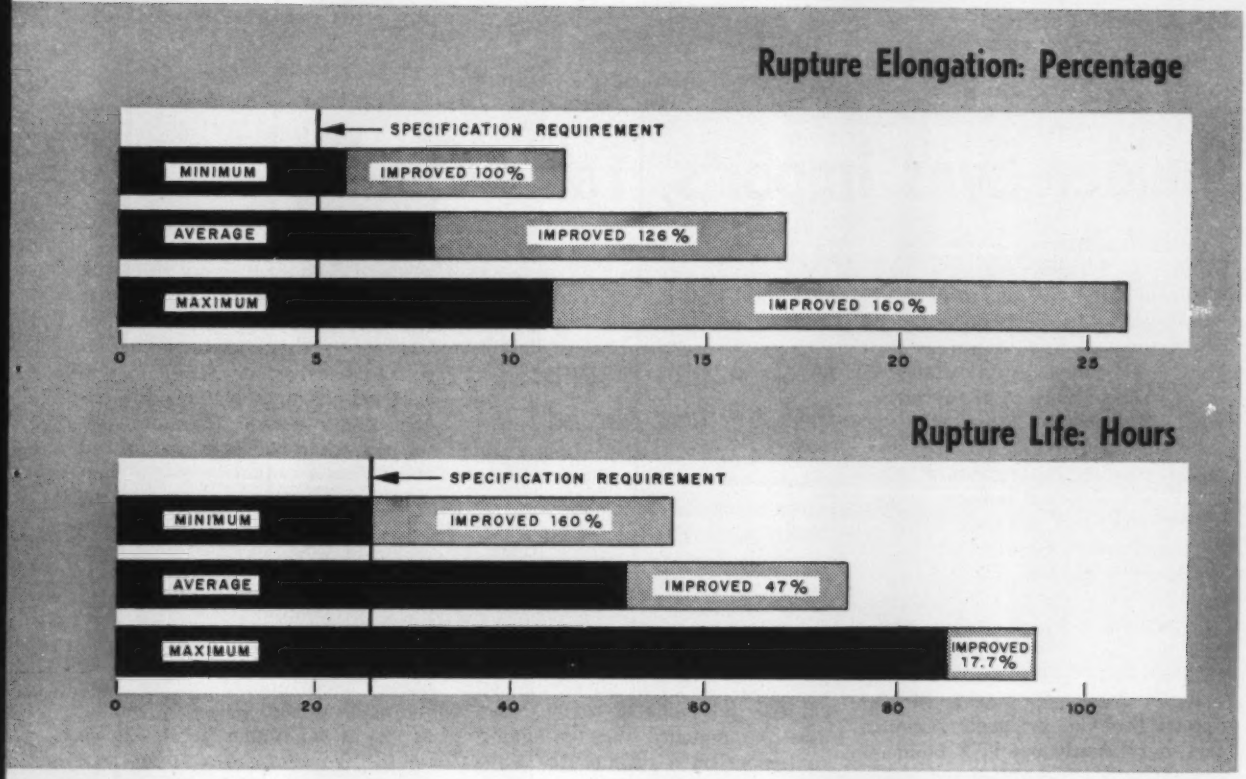
In testing stability to thermal cycling, a turbine blade made from WI-52 was exposed to 100 cycles—heating at 2000° F for 2 minutes, followed by cold air quenching for 40 seconds. The blade developed a deflection or blade bow of only 0.010 in. A similar blade, made of another alloy, showed 0.140 in. deflection.

At 1800° F, the alloy's tensile strength is about 40,000 psi; yield strength (0.2 per cent offset) is about 30,000 psi.

• Improved properties are obtained by greater control in manufacturing the alloy.

Say R. F. Waindle, president of WaiMet: "The improved results are the outcome of an 18 month research program. It was found that proper sequencing and addition of the alloying elements in the refining process minimized the formation of deleterious compounds. At 1800° F, the alloy now exceeds applicable specifications by 130 per cent for stress rupture life, by 120 per cent for rupture elongation."

The aircraft specification calls for testing at 1800° F and a stress of 15,500 psi. Requirements are: 23 hours minimum stress rupture life and 5 per cent in 1 in. stress rupture elongation. The improved alloy offers 53 hours minimum for stress rupture life and 11 per cent stress rupture elongation. Acceptance tests on ten recent production heats show averages of 73 hours in stress rupture life and elongation of 17 per



Life of Superalloy Castings

cent, the company reports.

• The cobalt base, high tungsten alloy is usually investment cast and melted in air.

Foundry characteristics of the alloy are said to be excellent. It is easy to control in melting, and there is little tendency to lose control of chemistry; as with other cast alloys, carbon control is important. WaiMet feels that the advantages of melting in air with relatively simple equipment will outweigh, in many cases, the somewhat better stress rupture properties that can be developed with vacuum melted nickel base alloys.

Heat treatment, after investment casting, is not usual. As-cast, the alloy hardness is about Rockwell C38; aging at 1475° F for 50 hours will increase the hardness to C45.

The alloy has this composition:

	Percentage
Tungsten	10.0-12.0
Chromium	20.0-22.0
Carbon	0.40-0.50
Nickel	1.0 max
Iron	1.00-2.50
Columbium & Tantalum	1.50-2.50
Phosphorus	0.040 max
Sulfur	0.040 max
Manganese	0.50 max
Silicon	0.50 max
Cobalt	balance

Columbium is a strong carbide former; carbides are formed at high temperatures. The tungsten strengthens the matrix, and carbides of tungsten also assist in the strengthening process. The chromium primarily aids corrosion resistance but is also a matrix strengthener.

• Quality checks include melting and casting test bars for physical property determinations.

WaiMet makes the alloy by air melting in an induction furnace. The process has been automated, which eliminates reladling for pouring, so there is less chance for contamination.

A sample of the product is taken and melted under conditions simulating the production foundry. Test bars are cast in investment molds from the melt and tested at 1800° F for their stress rupture characteristics. The test procedure serves as a check of melt practice.

The company feels that further improvement in the WI-52 analysis is likely to be small. Instead, the next step will be the development of a new cobalt base alloy with higher oxidation resistance at high temperatures.

Builder Eyes Imports, Talks Quality

IS A U. S.-made machine tool worth 40 to 60 per cent more than its foreign counterpart? Beyond a doubt, some machine tool users say "No," and the answer concerns U. S. builders more than any other single problem they face.

Because foreign competition promises to increase in the future, you can expect domestic builders to be talking more and more about quality. And where quality used to be expressed in glittering sales phrases, it will increasingly be told in terms of tolerances and performance. And, more and more, you'll see quality spelled out in guarantees.

R. F. Moore, president, Moore Special Tool Co., Bridgeport, Conn., says that the only way U. S. builders can offset the cost difference is by ". . . standing firm on superior engineering and workmanship. This must be done by aggressive marketing of proved values."

• Guarantees of quality may help some builders get customers equating the difference in initial price against the difference in long term cost.

Mr. Moore sees the need to prove quality, performance, machine life, and maintenance cost advantages. To dramatize the points for his company's products, Mr. Moore has announced a ten-year guarantee—that his superprecision machines will stay within a few millionths of initial published tolerances.

"We guarantee that the basic locating features of the standard No. 3 jig borer and No. 3 jig grinder will not wear or deviate in normal uses beyond published tolerances over a ten-year period more than 50 millionths in lead screws, 15 millionths in jig borer quill fit, 50 millionths in jig grinder vertical slide fit, 20 millionths in compound slide squareness, 30 millionths in base ways and table ways, 50 millionths in squareness of spindle to plane of travel."

Behind the guarantee, says Mr. Moore, is the company's experience with hardened, ground, and lapped lead screws.

More Surplus Machines May Be Sent Abroad

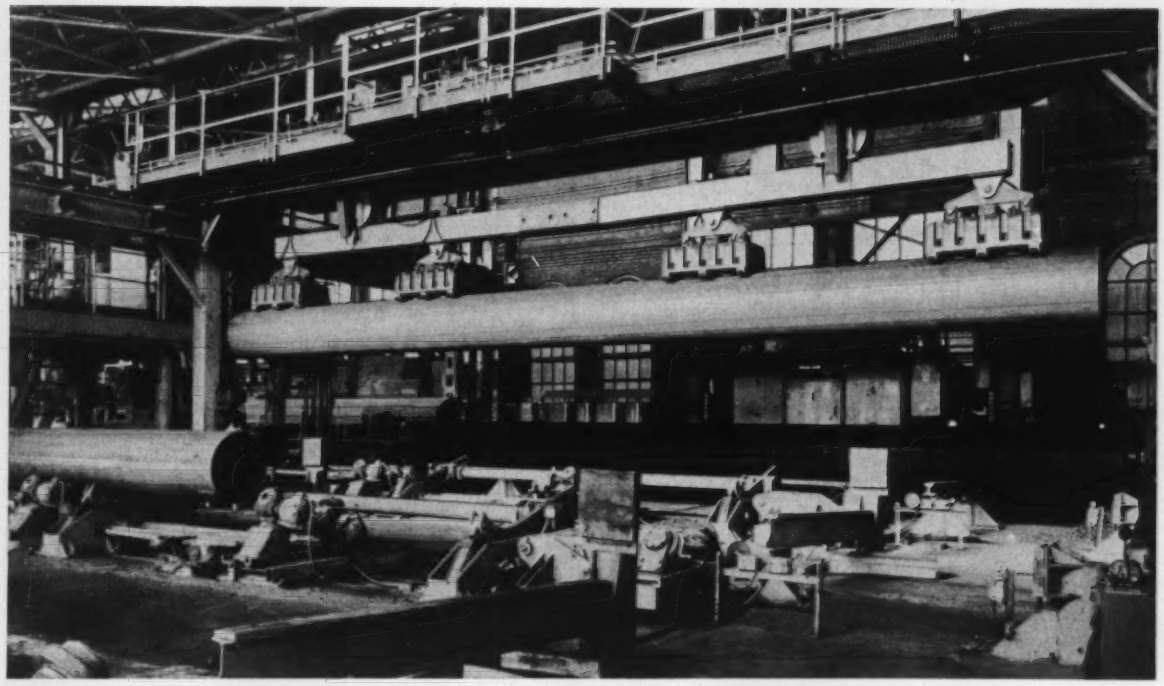
The U. S. may soon increase the number of surplus machine tools it sends to underdeveloped nations. The reason: The International Cooperation Administration and other government agencies are trying to work out some of the snags that have kept the program in low gear.

The main stumbling block has been that ICA has no storage facilities. So demand from abroad must be matched directly against equipment on a surplus list at the time. ICA spokesmen are proposing that they be provided with facilities for "anticipatory procurement." The facilities (perhaps space in present storage areas) would permit ICA to get good machines as they are available, then assemble them into logical production packages. So instead of offering a random group of machines to a foreign country, the agency could offer all the equipment, for example, to equip a complete maintenance shop abroad.

The proposal is also being pushed by machine tool industry representatives who are anxious to see the machines used abroad rather than dumped on the domestic market at prices far under their current value.

Grinder Given Electrical Assistance

AN ELECTRICALLY ASSISTED grinder saves $15,000 annually for an automaker. The attachment (made by Wendt-Sonis Corp., Hannibal, Mo.) is used on a Cincinnati manual feed grinder. Removal rate: 0.040 in. of 8 x ½ x ¼ in. TC-2 carbide in 4 minutes. The arrangement previously used removed 0.050 in. from two blades in 40 minutes. Profilometer readings (rms) have improved from 12 to 7.



Welded sections leave for the test area . . .

Pipe Production Expedited By Cranes with Memories

• LOOKING FOR ways to speed movement of materials in process and product flow in your plant? You may find automatically controlled cranes useful for repetitive operations. Such machinery is helping to prevent pipe production bottlenecks at Bethlehem Steel Co.'s Steelton, Pa., plant.

Sensing devices, memory units, limit switches, and crane magnets were supplied by E. C. & M. Div., Cleveland, of the Square D Co.

• A memory unit controls the crane that carries pipe from welding stations to the test area.

Pipe is transferred from three separate skids (serving the three seam welding lines) to an unloader cradle for delivery to the testing station. Pipe from the first skid is delivered directly to the cradle by a kickoff device. The other two skids are unloaded by an automatically controlled crane.

The transfer cycle starts automatically when pipe enters any one of the skids. A memory unit stores information from the skids and records the order in which the pipe sections arrive. The sections are transferred in order of their arrival at the skids.

Limit switches and interlocks develop commands that make for smooth crane operation and product flow. Each operating cycle is completed before the subsequent cycle is started to prevent pileup on the unloader cradle.

Graduated slowdown on the crane travel controller insures smooth stopping and accurate centering over the pipe sections. Magnets with concave pole shoes are suspended from a jointed spreader bar—designed by Bethlehem engineers for easier alignment with the pipe. A limit switch stops the hoist motor just as the magnets touch the pipe. And magnet power is turned on and off automatically.

• Plates for the pipe mill are fed automatically onto a motorized table for transfer to the side planer.

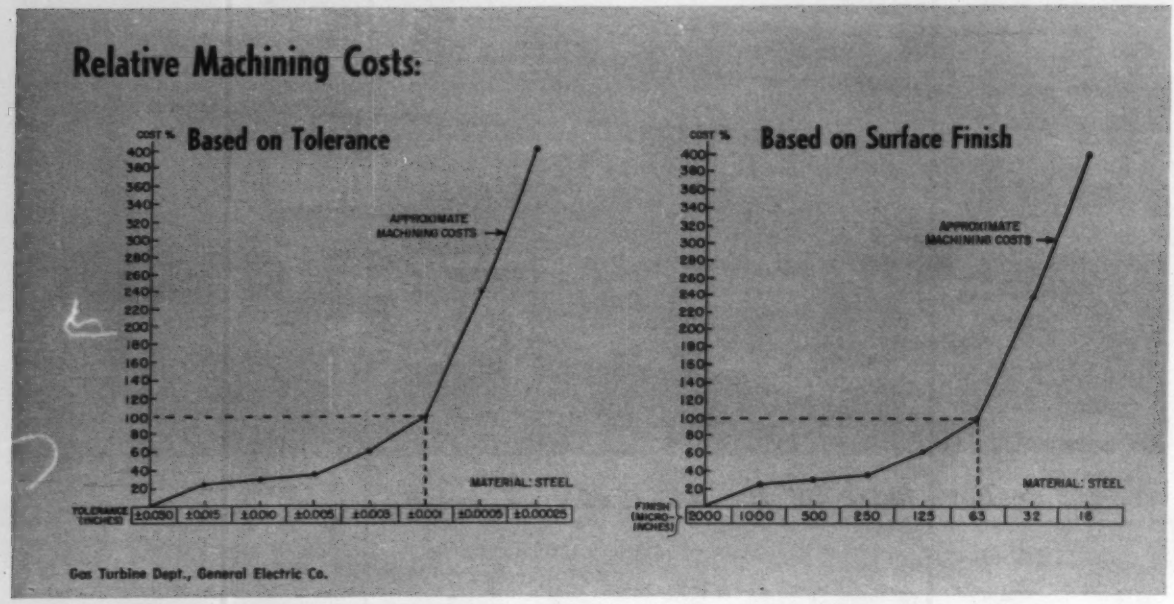
Rail cars carry plates to the company's new line pipe mill (see STEEL, Nov. 14, 1960, p. 112), where they are unloaded by a magnet crane and stacked on either side of an outdoor, motorized receiving table. Then the automatic crane, which is mounted over the table and equipped with vacuum lifting cups, transfers the plates one at a time to the table. The moving table takes the plates to the side planer station inside the building.

The operator actuates a switch to initiate the unstacking cycle on the right or left side of the table. The crane unstacks all plates on that side of the table, then returns to rest position.

Limit switches and interlocks keep the crane from dropping a plate on the receiving table before the previous one has been taken away. Similar devices control crane speeds, starting, and stopping.

DESIGN ENGINEERING CONFERENCE SPEAKER SAYS . . .

Sensible Tolerances and Finishes Pay Off



• ONE WAY to keep the lid on costs is to make sure your designers are not specifying smaller tolerances and smoother finishes than are necessary, advises Dr. William W. Gilbert, manager, Machining Development Service, General Electric Co., Schenectady, N. Y.

He made that statement at the American Society of Mechanical Engineers' Design Engineering Conference in Detroit last week.

• The size tolerance and surface finish specified by the designer influence the sequence and extent of operations and the material needed. Overspecification runs up manufacturing costs unnecessarily, Dr. Gilbert declared.

The rise in machining costs under those conditions is shown in the charts above. For example, machining cost may be increased 16 times by lowering the tolerance from ±0.015 in. to ±0.00025 in. When the tolerance is further reduced to ±0.0001 in., the costs would go up again (they would double), Dr. Gilbert pointed out.

A change of surface finish to require 16 microinches would make the machining cost 10 times what it would be for 250 microinches.

• "It has been assumed by some designers that reducing tolerances and demanding smoother finishes will improve the product. But, there are many exceptions to this rule," Dr. Gilbert said.

He added: "For example, it has been believed that a smoother finish for bearings will improve performance. That is not always so. Sleeve bearings and internal combustion cylinders should have a roughness of 4 to 8 microinches. A smoother finish reduces the lubrication and may cause early seizure.

"Although cutting tools for machining aluminum should have a smooth surface finish of 4 microinches or less, this good finish would be wasted on a roughing tool for turning steel. Here a 63 to 125 microinch finish gives just as good tool life at a cheaper grinding cost."

• Press fits are easier to make and will have higher holding power if a rough finish is specified. Smoother finishes will immediately require closer tolerances and higher costs, Dr. Gilbert pointed out.

"Stress concentrations and poor fatigue life may result from the improper application of a process. For instance, if a fine grained and hard grinding wheel is used to produce a smoother finish, the surface of heat sensitive alloys may be heat checked, and poor fatigue life will result. A rougher and softer grinding wheel, which cuts more freely, would give better fatigue life to the part, even though the surface finish may be rougher."

• Demands for excessively small tolerances and smooth finishes can also run up material costs, he pointed out.

"Design requirements will generally control the selection of the material for the part. It is often possible, however, to select alternate materials that will have a lower cost or that may be machined more easily," Dr. Gilbert stated.

Open Coil Process Cuts Carbon Content

• STEEL STRIP that's well suited for porcelain enameling can be made through carefully controlled open coil decarburization, says D. J. Blickwede, director of research, applications, Bethlehem Steel Co., Bethlehem, Pa.

Besides having an extremely low percentage of carbon, the finished strip is virtually free from sag, distortion, and surface flaws.

The process as practiced at Bethlehem, some of the problems encountered, and their solutions were described by Dr. Blickwede at a meeting of the American Iron & Steel Institute (AISI), in New York.

• Atmosphere, temperature, and heating rates are closely controlled to minimize carbon content and avoid external or internal oxidation.

Open wound coils are heated to 1200° F in a nitrogen atmosphere that contains 4 per cent dry hydrogen. In the next step, the percentage of hydrogen is boosted to 18. At 1300° F, steam is introduced for decarburization, and carbon content is reduced to about 0.004 per cent.

Reaction rate depends on how fast carbon diffuses through the steel to the surface to react with steam, and how fast steam can be delivered to the surface. Other factors: Reaction speed of the carbon and steam, and how fast reaction products can be carried away.

If moisture is introduced before slow heating parts of the strip get up to decarburizing temperature, the strip surface will oxidize. And some alloys oxidize internally in an atmosphere that doesn't cause surface oxidation.

• Careful coil handling contributes to uniform annealing and decarburization. It also helps prevent strip distortion.

Coil laps are kept apart during annealing by a kinked, high carbon steel wire, which is strong enough to space strip up to 10 gage. That allows gases to circulate freely. The wire permits movement of the coil without shifting the laps, and prevents scratching, which would occur if one lap rubbed against another. It helps keep the coil cylindrical, so the coil breaks are minimized in the tight winding operation after annealing.

Previously, string was used as a spacer in open winding, then removed before annealing. Coil distortion often occurred because the laps didn't stay in place, or because annealing bases weren't flat.

Oxygen Keeps Open Hearths Competitive

• THE TREND toward greater efficiency and higher ingot tonnages (made possible by design improvements and proper use of oxygen in steelmaking) could keep open hearths competitive with the basic oxygen processes, says J. W. Kirkpatrick, assistant to the vice president, steel plant operations, Youngstown Sheet & Tube Co.

The rapid rise in the amount of oxygen used in open hearths during the last five years was described by Mr. Kirkpatrick at a meeting of the American Iron & Steel Institute (AISI), in New York. He cited 1960 as the turning point in the conversion of open hearths to the semipneumatic process.

• Ingot tonnages have continued to climb as oxygen use evolved from flame enrichment to roof lances to oxyfuel burners.

Higher fire power for open hearth melting is said to be a sure bet in the foreseeable future. Oxygen lances have been used in the last year at Granite City Steel Corp., Granite City, Ill.; at Ford Motor Co., Steel Div., Detroit; and at Great Lakes Steel Div., Detroit, of National Steel Corp. The lances are said to boost flame temperatures from 3700° F up to 4900° F. And they show promise in furnace atmosphere control and control of oxidation in the scrap and molten charge.

Several types of oxygas lances are being tested. And similar lances for injection of liquid fuels are under development.

Oxygen for flame enrichment has helped boost output of older open hearth shops, where regenerative systems cannot supply large quantities of highly preheated air for fuel combustion. The development of basic refractories, which have made roof lancing practical, has brought about further reduction of heat times.

• Spectacular production increases in experimental heats are attributed to high flow, oxygen roof lancing by Youngstown Sheet & Tube.

Production rates up to 82 tons an hour were achieved at Youngstown's Indiana Harbor (Ind.) plant. The procedure: Fast scrap charging, immediate hot metal addition, high fuel firing rates through the iron addition, and high oxygen flow from roof lances.

Fuel consumption was less than half that required in nonoxygen practice. The heats were made in some cases in less than 3½ hours, and heat times were consistent.

The high flow oxygen practice was also used successfully at the company's Campbell (Ohio) Works.

Changes Cited in Job Lot Production

"ASSESS your manufacturing systems in relation to the opportunities available from the machining center concept," Carl Perry urged engineers attending the convention of the American Society of Tool & Manufacturing Engineers in New York last week.

(His definition: A numerically controlled system for automatic machining of a variety of parts. The systems include automatic tool change and automatic part positioning.)

As proof of the potential, Mr. Perry, product manager, Industrial Systems Div., Hughes Aircraft Co., El Segundo, Calif., cited a line his company installed in 1958 (STEEL, Mar. 31, 1958, p. 84). It has demonstrated tooling and manufacturing savings that average $86,000 a year.

"Numerically controlled machining centers are relative newcomers, yet they are already exerting a profound influence on job lot manufacturing and on the tool and manufacturing engineering profession. The reason for this remarkable impact is that the machining center is considerably more than a new machine tool. It is a forceful new philosophy of manufacturing."

• Four major improvements can broaden the potential for machining centers.

Mr. Perry picks four areas of further refinement that will enhance the payoff to job lot producers:

1. Building block design of machine base and head assemblies and a wider variety of optional features will be made available. The result: Users can select and pay for exactly the degree of versatility they need.

2. Machine positioning times will be cut by 25 per cent, further reducing the nonproductive time of the machine cycles and increasing the profitmaking capabilities of the equipment.

3. New tool change systems will be 33 per cent faster than the best available today.

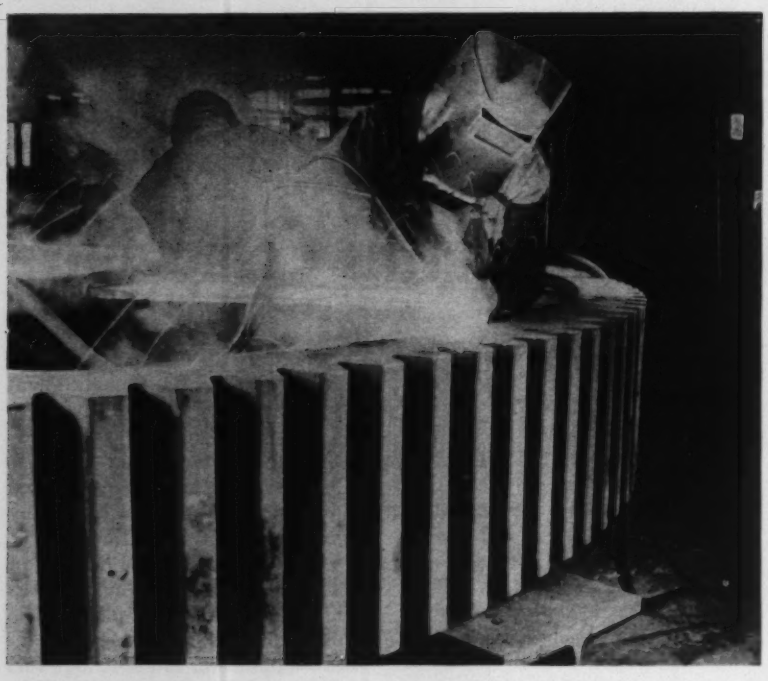
4. Forthcoming tool magazines will be loaded and unloaded away from the machine center, then simply put on the machine when the new job is readied. It could cut setup time drastically.

Mr. Perry feels that those changes, plus increasing utilization of machining centers, will further change and improve the lot of short run producers.

• Ceramic tools can cut malleable iron from two to eight times as fast as other cutting tools.

Hans J. Heine, technical director, Malleable Founders Society, told engineers that a recent study of machining malleable iron showed: 1. A substantial difference was found between different brands of ceramics. 2. Best tool life came with a 30 degree land angle.

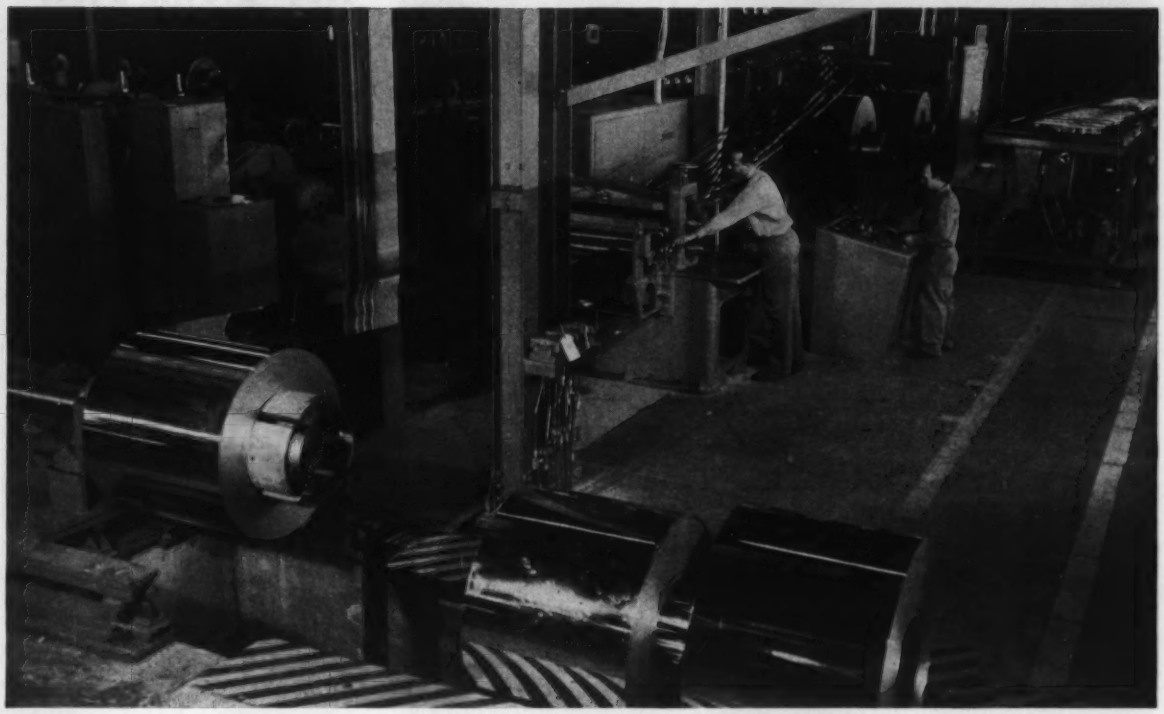
Test results, he said, "suggest that ceramic cutting tools can be successfully employed in cutting operations involving both plain and interrupted cuts on malleable iron."



Semiautomatic Ups Welder Efficiency

GIANT gear teeth are being welded to 1 in. steel plates (Type A-7) in the fabrication of gears 15½ ft in diameter. They will lift 400 ton gates on locks being built on the Ohio River near Warsaw, Ky.

By employing semiautomatic tools (Unionarc from Linde Co., a division of Union Carbide Corp., New York), the builder achieved a 75 per cent operating factor (50 per cent is normal for stick electrodes). Finished gears are stress relieved at 1200° F for 6 hours before final machining.



Proper payoff reel alignment helps meet width tolerances . . .

Slitter Saves Quality in Thin Gage Strip

• **THIN GAGE steel strip with an extremely good surface and close dimensional tolerances is turned out at a rate of 300 miles per hour on a new slitting line at Edgcomb Steel & Aluminum Corp., Hillside, N. J. The line was built by H. J. Ruesch Machine Co., Newark, N. J.**

"We're pleased with the speed and efficiency of the line," says Harry Edgcomb, president. "But far more important to our customers are the features that insure a high quality product."

• **Accurate edge control on the payoff reel helps the line meet extremely close width tolerances.**

Position of the payoff reel in relation to the slitter is automatically regulated by an edge control unit. That keeps the original coil moving straight into the slitter, without pressure on the side guides or the slitting knives. (Such side pressures are sometimes caused by coils that are wound unevenly at the mill.)

Arbors in the slitting machine are set in heavy duty, precision bearings, so the machine can hold width tolerances that are far better than commercial standards.

• **Quality strip is insured on long runs by hardened and ground stripping rings.**

Conventional stripper fingers or rubber rings can be used to separate the slit strip. Or the company can use hardened and ground stripping rings, which were developed by Ruesch engineers. The rings are made to the exact width of the finished strip; cost of making them is justified only on the basis of heavy tonnage or repetitive slitting requirements.

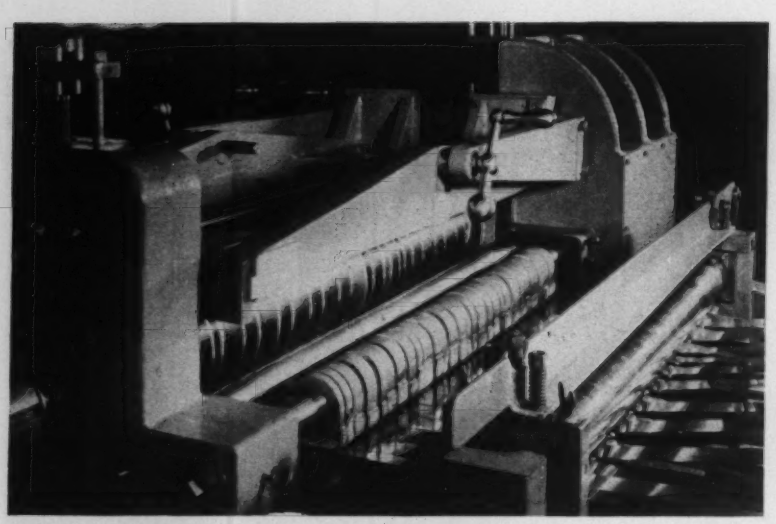
Prime purpose of the rings: To strip the slit material from the cutters. But they also offer other benefits that are important in high quality strip.

Each ring is held in place on the strip by pressure. Even distribution of that pressure over the entire width of the slit strip keeps it flat—an important factor in the control of width tolerance and crossbow.

The rings rotate at the same speed as the strip, so the surface isn't scratched. And the rings minimize formation of burrs on the strip edge because they support the whole strip width.

• **Camber in the product is minimized by tandem takeup reels. Surface quality is preserved by eliminating a second rewind at the exit end.**

Tandem takeup reels are used at the exit end of the line. Alternate strips are wound onto the first or second reel in a straight line. Result: All strips can be pulled straight through from the slitter, preventing



STRIPPING FINGERS take stock from the cutters. They also help insure accurate widths by maintaining uniform pressure across the slit strip

SLIT STRIP is automatically unloaded from the rewinders, upended, and carried by conveyor to an automatic strapping machine

fan out and reducing a possible cause of strip camber.

The line can turn out coils with inside diameters of 8, 10, 12, 14, or 16 in., directly off the slitter. That often eliminates a second rewinding operation, which would be costly. Rewinding also tends to damage the edges and abrade the surface of the slit product.

• **Automatic coil handling and powerful, direct current drives make for fast, efficient slitting.**

The payoff reel (which can handle coils weighing up to 20,000 lb), the slitter, and the tandem rewinders are driven by direct current motors at speeds up to 1000 ft a minute.

Rewinders are unloaded automatically. Slit coils are upended automatically, taken by conveyor to an automatic strapping machine, and packed for shipment.

'Hot' Drawn Steel Ups Reliability

• **STEEL improved by a process called elevated temperature drawing can help you get improved performance in critical areas like powershafts, says Allis-Chalmers Corp., Milwaukee.**

The firm employs such a steel for the main clutchshafts on its Gleaner-Baldwin combining machines. It says none has failed in tests over a five year period. (Called Fatigue Proof, it's supplied by La Salle Steel Co., Hammond, Ind.)

Other advantages compared with an ASTM grade of steel:

- Material costs 4.5 per cent less.
- Machining time is 25 per cent less.
- Material uniformity has been improved.
- Cutting tool life has been increased 40 per cent.
- Rejects have been reduced from 3 per cent to less than 0.2 per cent.

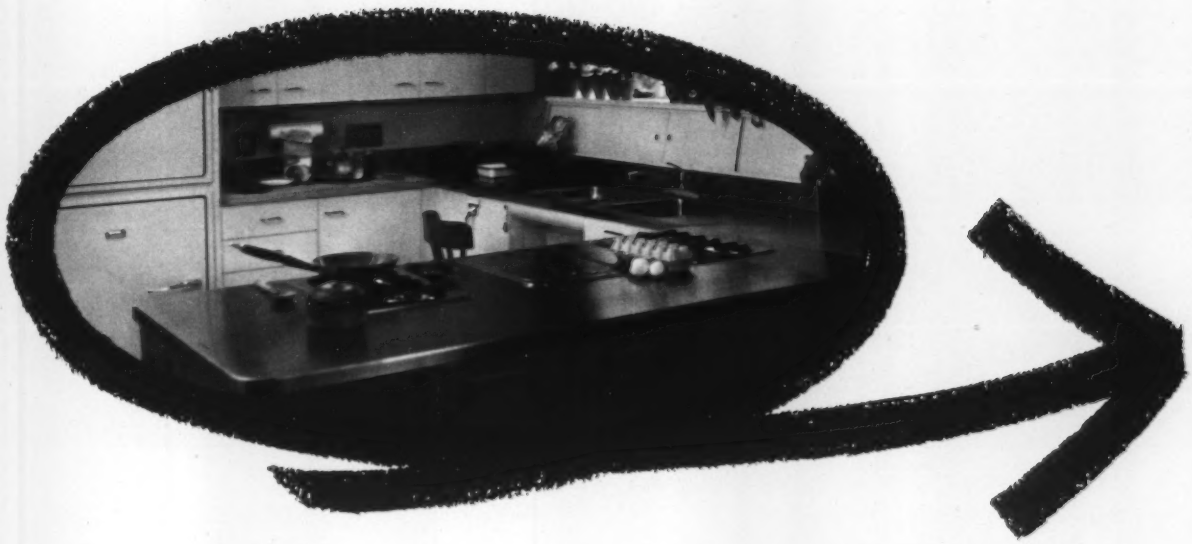
• **Main clutchshafts are employed on Gleaner-Baldwin combines. Raw material bars are 1⅞ to 2⅛ in. in diameter, 110 to 133 in. long.**

Improved machinability of the stock enables the firm to save 25 per cent in grinding costs, since cutting tools can now remove stock to within 0.015 in. of the finished size before grinding without developing internal stresses.

Heat Treating Process Removes White Layer

A HEAT treating process called Ban-Wite removes the white layer from nitrided steels such as Nitralloy 135, SAE 4140, and SAE 4340. Grinding is not required, says the developer (National Broach & Machine Co., Detroit). In addition, the method also tends to increase case depth.

The process is carried out by coating the nitrided steel part with an impervious heat resistant material, heating it under controlled conditions, then removing the coating. The company's plans for the process include industrial licensing.



Appliances and Allegheny Stainless

Stainless...a growing force in appliance marketing

Stainless steel is unique among fabricated metals. It alone has a day-to-day familiarity for most people . . . an immediate product recognition. They see it everywhere . . . never painted over, never plated over . . . in their automobiles, in their homes, in their tools and sporting equipment. They know they can comfortably ignore it forever, and still depend on it. They look for it in the products they buy. Stainless is a marketing man's metal. It sells itself.

More and more manufacturers are beginning to recognize the potentialities of this built-in customer acceptance. Nowhere is this more true than in the appliance industry. And in this energetic and highly competitive field, one name stands out. The biggest name now marketing stainless steel in appliance design . . . Speed Queen, a Division of McGraw-Edison Company.

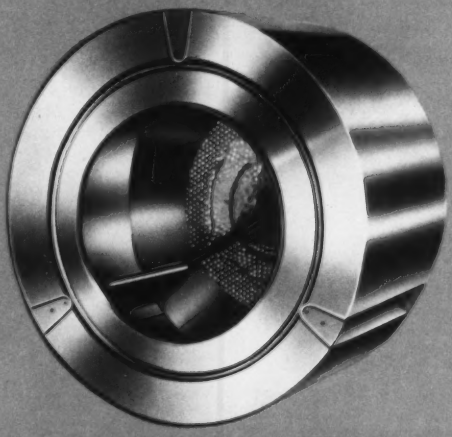
Speed Queen's automatic washers and dryers have always been engineered for absolute product dependability. And the almost inevitable result of this design philosophy has been to feature stainless steel in the major unit components: the washer tub and the dryer drum.

Easily formed into smooth, operationally desirable baffles and contours, stainless steel provides maximum protection for a Speed Queen load of clothes throughout all washing and drying cycles. Slick and snag-free to pamper the most delicate fabrics, stainless is tough enough to shrug off the battering that only the usual miscellany forgotten in a boy's trouser pocket can inflict.

Speed Queen introduced stainless to provide rust-free, chip-free reliability for their customers. But they have also used stainless to help them sell. While other manufacturers use bits and pieces of stainless, Speed Queen has featured it in a big way . . . for years. And they can tell the world about it. They can go into their markets with persuasive and exclusive sales messages, and reach prospects already pre-sold and strongly preconditioned to look for stainless steel.

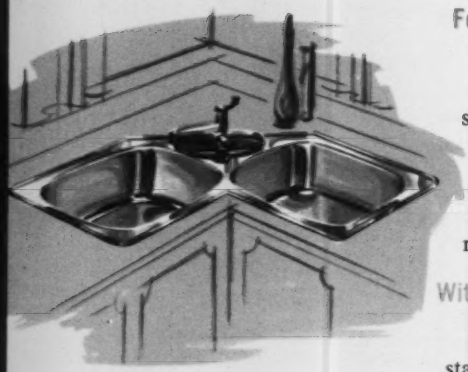
They can point to themselves as pioneers in the use of stainless in home laundry equipment. They can point to themselves as the only suppliers of stainless steel washer tubs and dryer drums. They can guarantee these components for a lifetime. They have a powerful sales feature. They have put stainless steel to work for their customers. And, they have made it work for themselves. Allegheny Stainless Steel can do the same for you . . . for your products. It's a marketable metal.

First with domestic washer tubs of stainless steel, Speed Queen has continued to feature them over the years. Their reliability, chip resistance, and unmatched resistance to corrosion are in keeping with the firm's tradition of absolute product dependability.

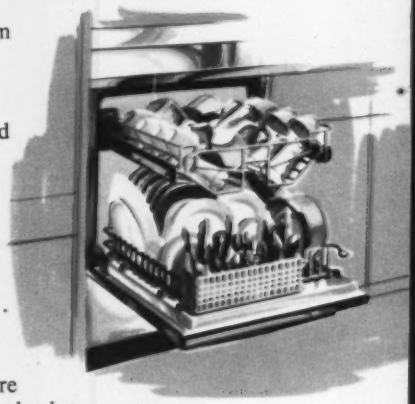


Exclusive with Speed Queen, the stainless steel dryer drum provides maximum protection for all fabrics during the drying cycle. Virtually indestructible, and like the washer tub of Type 201 stainless steel, this component can carry the guarantee of lifetime service.

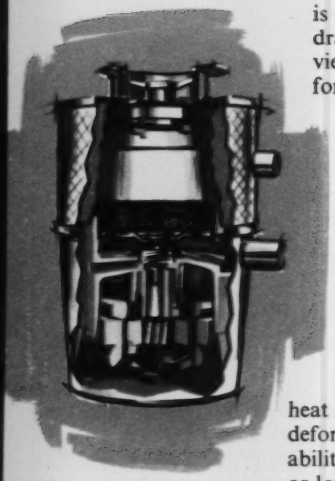
Allegheny Stainless for beauty with a function



For sinks and hardware . . . stainless steel, the logical choice. Here is an application where Allegheny Stainless can really shine, literally. Under the roughest use, under the battering of heavy pots and pans, under constant detergents and grease residue, the stainless surface remains unblemished, free of nicks or chips, and no corrosion or dark stains from chemically treated water, either. Stainless is easy to fabricate and finish, too. The new, special quality stainless steels now available make tough draws like bowls, drains, and baskets a simple matter. And, stainless can be the most economical metal for plumbing fixtures and hardware . . . looks better, longer, too.



With automatic dishwashers . . . there is freedom from a thankless task. Stainless steel helps keep it that way. Only pump impellers of stainless steel can be trusted to deal out the Niagara-like rush of water needed to power-wash and power-rinse dishes really clean. And with Allegheny Stainless, there's no corrosion, no erosion, no chance of staining dishes. There are stainless guides and channels to insure easy, no-stick operation of the door and trays. There is stainless out of sight . . . in manifolding, seals, seats and drains . . . for real peace of mind. There is stainless in plain view . . . door fronts, counter-high tops, hinges and hardware . . . for ease of cleaning, and long lasting, tasteful elegance.



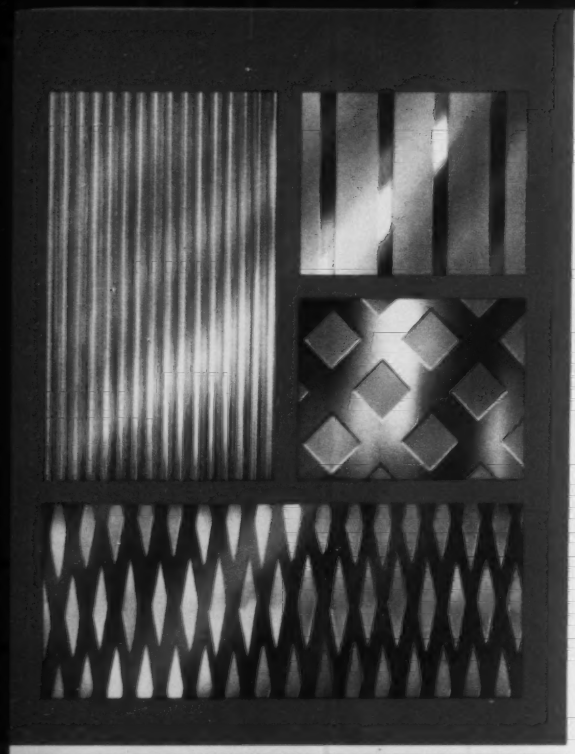
For garbage disposers . . . another thankless kitchen chore where long wear, sanitation, and corrosion resistance are absolute musts. Stainless steel's unique properties . . . excellent machinability and retention of hardness, corrosion resistance, and joint strength after welding or brazing . . . have proven ideal for this application. Whether in the flywheel, the cutter ring, the inner shell, or just for appearance's sake, Allegheny Stainless is unsurpassed . . . by any standard of comparison.

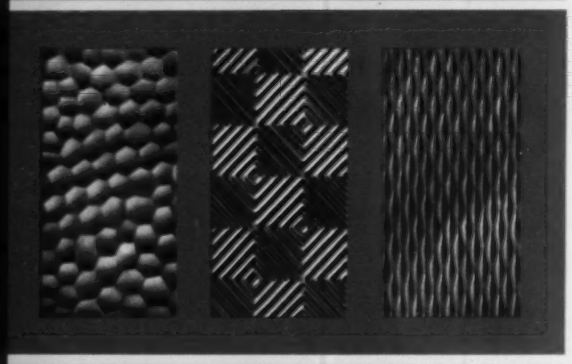
For heating coils . . . Type 332 Allegheny Stainless sheathing provides heat and scaling resistance to 1650 F. For high strength at red heat to support the heaviest pots and pans without deforming, for sliding wear resistance and ultimate cleanability, for economy in high wattage surface units or low wattage oven units . . . for all these reasons, stainless steel and kitchen heating are inseparable. But stainless has more to offer . . . a flash of brilliance in the trim ring around the burners—odor-free, wipe-clean drip pans under the burners—decorative wall tile spatter-shields—an entire custom cook top, gleaming bright and utterly impervious.

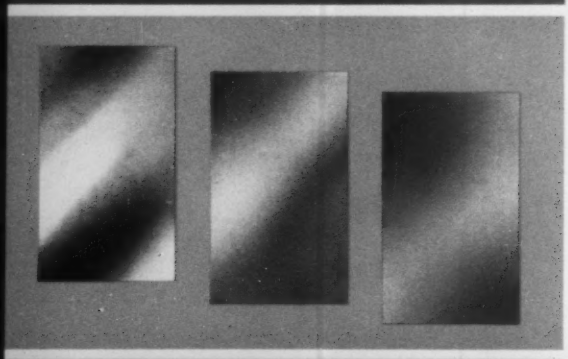
For decorative panels . . . for door-fronts and gleaming accents, for strictly show and for practical, chip-proof, scuff resistant beauty, too . . . stainless steel simply can't be topped. More than a coating . . . a plating, even . . . Allegheny Stainless is stainless utility and beauty clear through. Whether a soft, frosty luster is indicated by the final decor . . . or a brilliant mirror's shine, or any kind of rolled-on pattern you can dream up . . . stainless steel by Allegheny Ludlum can do it better, for longer, and for far less than you think.

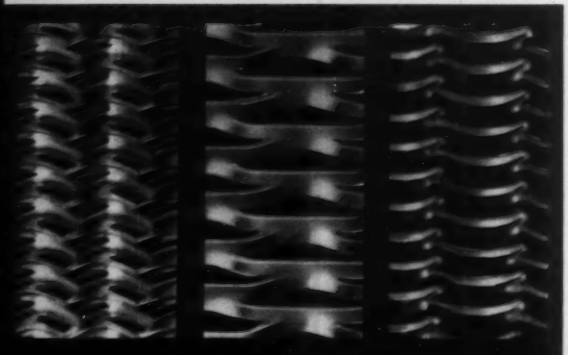
Appliances and Allegheny Stainless

Complemented by the soft gleam of stainless steel counter tops and decorative panels, these St. Charles Custom Kitchens would be welcomed in any home. Satiny stainless steel has the unique ability to blend beautifully with any decor, any color scheme.









IDEA STARTERS

Patterns An endless variety of decorative surface patterns can be mill-produced on Allegheny Stainless Steel. Generally achieved by specially prepared rolls, these patterns are often extremely practical as well as ornamental, serving to protect and stiffen the decorated panel, and to diffuse reflected light in interesting and useful ways. Virtually any design that can be drawn on paper can be reproduced on stainless steel.

Aside from its practical aspects, A-L patterned stainless also serves to broaden the scope of a designer's imagination. It can be used gracefully to break up large, flat areas of stainless panels, to cause the eye to focus on one aspect of an appliance design over another, and to emphasize or minimize shape and apparent dimension. Patterns can be obtained over any surface finish, and unlimited combinations of mirror-bright and softer lusters are possible. For light weight and freedom from dents and scratches, let Allegheny Ludlum show you what patterned stainless can do for your product line.

Textures Where even greater strength, stability, and resistance to warpage and "oil canning" are required, a wide variety of heavily textured or Rigidized patterns is also available. These textured impressions, either unidirectional or multidirectional, are considerably deeper than those on patterned stainless and have a marked stiffening effect on the decorated panels, permitting economically lighter gages of Allegheny Stainless to be specified.

Finishes The appliance maker is limited in his choice of stainless finishes only by the degree to which fabricating and joining marks must be blended into the final appearance of the surface. Available Allegheny Ludlum finishes cover the complete range from frosty white through a brilliant mirror shine, with the softer finishes permitting more grinding, buffing, and blending to remove all trace of weld beads, scratches, and other fabricating marks.

It is a highly questionable practice, however, to habitually specify mirror finishes, and especially to attempt a glass-like polished flatness in large areas. An appearance of waviness, even on exceptionally true surfaces, inevitably results due to light reflectivity. Highly reflective finishes also tend to reflect light as a sharp line image at right angles to the lay or "grain" of the polish, and may tend to introduce distracting elements into an appliance design.

These difficulties are eliminated with the softer, brushed finishes, whose frosty white gleam can be integrated beautifully into any design treatment without regard for reflections.

Expanded Stainless Many designs are now incorporating the beauty of Allegheny Stainless in the relatively new, functional form of expanded metal. To all the useful attributes of stainless steel, expanded metal can add the ability to control admission of light, heat, liquid, semi-solid, gas, and sound to or from any enclosure. For the more practical applications, expanded Allegheny Stainless can be utilized as baskets, guards or gratings, operating in any environment and under service conditions that would ruin other materials entirely. For purely decorative uses, the gleam of stainless can be retained in the expanded grid-like pattern to add soft or sparkling accents to door fronts, vents, and other functional appliance openings.

. . . for your design notebook

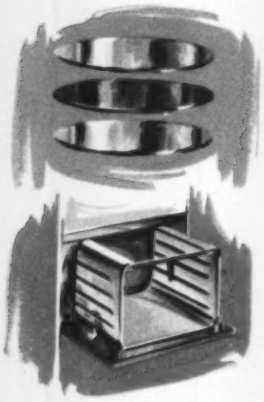
An important service which Allegheny Ludlum extends to the American metalworking industry is the maintenance of one of the country's finest research and development organizations to search out new methods, new steels, and new ideas. Many of the recent developments should be of considerable interest to the appliance industry.

TYPE 430 The phenomenon of roping is an excellent example. Some appliance fabricators were running into a furrowed, wrinkled appearance in their product after severe stretching operations. Aside from heavy mechanical polishing to remove these lines or "ropes," rejection was the only alternative. A-L's solution was a combination of processing and alloying steps which produced uniform ductility across the strip. A-L Type 430, low roping quality, is already in use throughout the country. It's worth investigating.

BRIGHT ANNEALING Speaking of polishing, it used to be necessary to buff up the surface of the strip because of the dulling, pickling treatment employed to remove oxide after mill annealing. Not any longer. Allegheny Ludlum's bright annealing process has been in full production since November 1, 1960, annealing stainless in pure, dry hydrogen on a tonnage basis. No oxidation, no surface-dulling pickling needed to remove it. The bonus is a clean, bright surface ready for fabrication with little or no buffing needed. For a really pretty shine, ask your A-L man to show you a #2 Bright Annealed finish sample.

A-L 433 There's even a new steel to try on your tough corrosion problems. Tentatively called A-L 433 and patent applied for, this copper-moly modification has the greatest corrosion resistance of any straight chromium stainless steel. Developed from Type 430, and available now at no price premium over the standard 430, A-L's new 433 is especially suited for applications where contact corrosion has been a problem.

AND, here are other developments worthy of your notice:



There is much going on with stainless steel cladding. There are flat disc cooking surfaces in the works made up of a stainless-copper sandwich with heating coils nestled inside. Its most obvious advantage is more efficient transfer of heat to pan bottom, plus better looks. Cast griddles are coming in for their share of attention, too. There's considerable interest in a thin stainless cladding to improve the appearance and the functional surface finish, and to eliminate buffing the castings.

There's a coating under development that has a lot of people wondering. It's destined to make finger-marking and water spots on seldom cleaned stainless a thing of the past. Maybe, it will be used in much handled areas. But, more important perhaps, it has one other extremely interesting ability. It can retard heat tinting on stainless grades not otherwise immune to this disqualifying characteristic. This makes it ideal for oven liners, since it will produce a surface that is bright and reflective, and will stay that way through years of carefree resistance to spilled-on, baked-on foods. And, it should be valuable in preserving the gleaming good looks of functional range hoods and kitchen exhaust system components.

All these things come out of research. All are new or fairly recent developments. All come from Allegheny Ludlum, the acknowledged leader in research in the specialty steel industry.

But, there's more being done, and much more yet to be done. There's interest once again in stainless wire . . . for refrigerator and oven shelving, for freezer baskets, for springs, fasteners, and other applications. Strong enough to permit considerable reductions in bulk and weight, stainless steel wire is moving back into its rightful place in the kitchen once again.

There's work being done with new stainless applications . . . with jobs that only stainless can perform, like the developmental dishwasher with built-in garbage disposer. And all this work is being done with Allegheny Ludlum as an active, interested partner, keeping pace with the needs and desires of the appliance industry, working with the appliance maker and backing him up with the A-L team of research and service specialists, unmatched anywhere. If you could use an experienced, helping hand with your metal problem, *your* A-L development specialist is only a phone call away.

Appliances and Allegheny Stainless

Large or small . . . by the ounce or in 25 pound slices . . . stainless steel offers the same lustrous beauty and honest utility to custom kitchen builders and gadget makers alike. Sparkling, easy-to-keep-clean kitchen utensils of stainless steel will keep their display counter shine in spite of constant exposure to kitchen acids and stains. Whatever the job, however often or infrequently the utensil is scoured and cleaned, stainless steel will keep it bright and shiny, ready for the close-up scrutiny of the most fastidious housewife. Eat from it, drink from it, or boil your coffee in it . . . you can depend on it when it's Allegheny Stainless . . . practical, functional, elegantly indestructible.

ALLEGHENY LUDLUM STEEL CORPORATION

General Headquarters: Oliver Building, Pittsburgh 22, Pa.

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

3102

LITHO IN U.S.A.

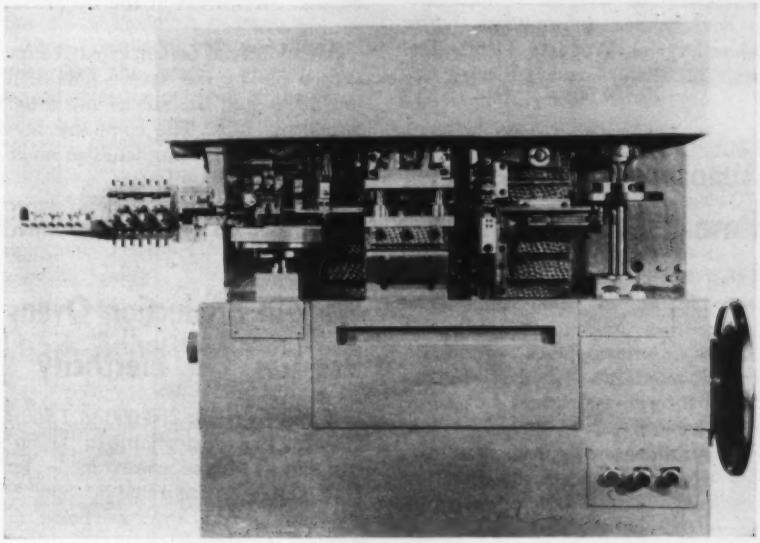
Small Four Slide Forms Small Parts Quickly

HIGH SPEED, precise production of small wire and strip components is handled with unusually low setup times by the V-80, vertical metal processing machine made by Torrington.

Stock capacity: ¾ in. wide, 0.032 in. thick (strip), or wire 1/16 in. in diameter. Production rates: 100 to 500 strokes per minute are standard; 100 to 350 strokes per minute can be achieved with maximum rise cams or maximum feed lengths (3 in. strip, 5 in. wire). The unit is 66 in. long and 25 in wide.

The V-80 is a smaller version of the larger vertical four slide forming machines built by Torrington.

For further information, *write* Machine Div., Torrington Mfg. Co., Torrington, Conn.



Simplicity Improves Toolholder Versatility

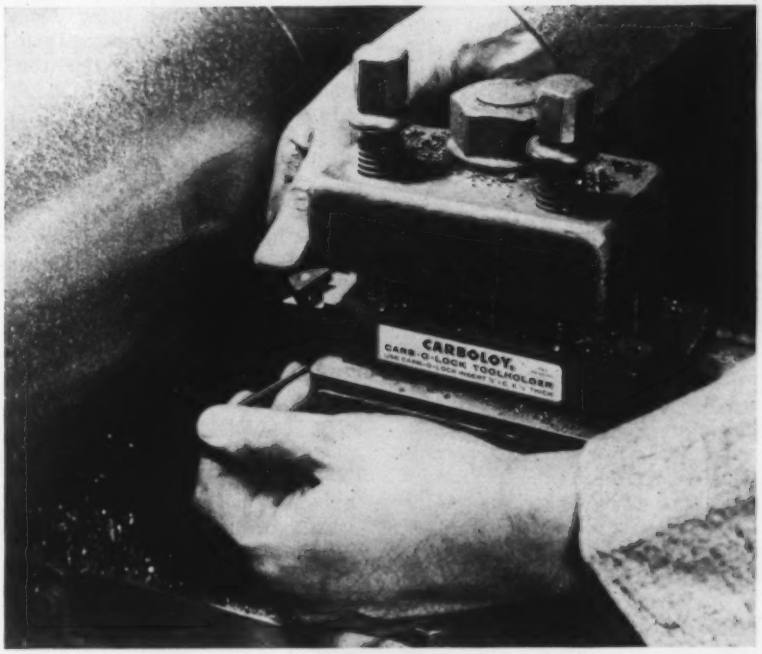
A HOLDER for disposable carbide tools features an internal cam that makes locking firm and vibration-proof, claims the maker, General Electric Co.

Cam action is completely enclosed to eliminate interference from dirt or chips. Even heavy cuts on cast iron will not loosen the insert, claims the firm.

Example: A facing operation on a malleable iron armature head in a locomotive car and equipment plant. Depth of cut, 3/16 in.; feed, 0.008 in. per revolution; surface speed, 670 sfpm. The holder and insert operated to the limit of the machine's power without failure.

The tool, called Carb-O-Lock, comes in 15 styles and 124 sizes and is said to cost almost a third less than comparable conventional holders.

The compact design is said to permit greater work clearances and to



make ganging practicable. End cutting edge angle is larger because no pocket is needed to retain the insert. That opens the way to tracer applications where the plunge angle is not too acute. The company says the holder may be used in many boring setups and also in many applications in automatic machines.

For further information, *write* Metallurgical Products Dept., Detroit 32, Mich., General Electric Co.

Atmosphere Furnaces Have Range to 3000° F

FIRING in oxidizing or nitrogen atmospheres in the temperature range from 2600 to 3000° F, and firing in atmospheres containing carbon monoxide or hydrogen up to 2730° F, are applications for a line of Kanthal-Super furnaces.

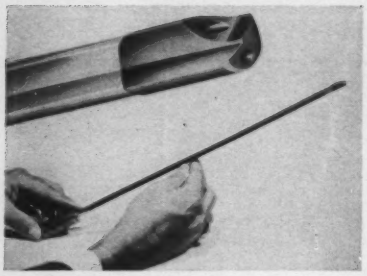
The units are equipped with heating elements made of molybdenum disilicate. The hearth of each furnace (except the smallest model, MS-7) is raised above the floor to expose the complete load to radiation and to aid heat transfer. You can get cabinet models (with the electrical and control components in a separate cabinet), elevator models, and shuttle kiln models.

For further information, *write* Harrop Precision Furnace Co., 3470 E. Fifth Ave., Columbus 19, Ohio.

Double Jet Gun Drill Improves Chip Flushing

MORE PIECES per grind is one benefit claimed by Star Cutter Co. for its double jet gun drill. The company adds that tool life is more than doubled because two holes (instead of one) are molded in the carbide tips of the single flute drills.

The lower hole is placed conventionally. It flushes the chips and provides a cushioning effect for the tool tip against the work. The additional upper hole provides more coolant flow to lubricate the tip. The company reports that the single hole drills sometimes fail to provide



enough lubrication at the tip of the cutting tool.

An additional benefit cited: Chips turned out by the double hole drill are about half the size of the usual gun drill chips. The company says the additional cooling tends to make the chips break up faster.

For further information, *write* Star Cutter Co., Farmington, Mich.

Walk-in Production Ovens Use Gas, Oil, Electricity

SIX models (from 250,000 to 1,500,000 Btu/hr) are available in the Super Duty S-Type ovens made by Despatch. They're rated at 850° F maximum. You have a choice of gas, oil, or electric types.

Oven bodies and heaters are constructed of 18 gage steel exterior, 16 gage aluminized steel interior, and have 6 in. of insulation. Ducts are of 16 gage aluminized steel, fans are alloy construction, and each oven is equipped with two swing doors, gravity exhaust stack, approved safety system, and indicating type controls.

Interior dimensions of the ovens range from 6 ft by 6 ft by 4 ft 6 in. to 12 ft by 8 ft by 6 ft 9 in. The manufacturer says the units produce fast, uniform heating.

For further information, *write* Despatch Oven Co., 619 S.E. Eighth St., Minneapolis 14, Minn.

Heavy Duty Assembly Tool Presses Automatically

INDEPENDENT pressing and staking forces can be adjusted from a light tap to 1 ton on the high speed, fully automatic assembly tool available from Cramer.

Standard interchangeable tooling adapts to a wide variety of work and can be changed by the operator in less than 1 minute. Compressed air power and precision machining assure fast, accurate production from primary components.

For further information, *write* Machine Tool Div., Cramer Controls Corp., Centerbrook, Conn.

Photoelectric Tape Reader Is Simple and Compact

SIMPLICITY and compactness in design and stability of operation with unusual flexibility in types of tapes and selection tape speeds is the way Omnitronics describes its bidirectional, photoelectric tape reader.

The versatile unit is suitable for applications such as input to digital computers, communication systems, tape converters, ground support equipment, checkout equipment, numerical machine tool control, and other punched tape programed equipment.

The manufacturer says an increased signal to noise ratio is achieved through the application of reflected chopped light in the actual reading process. The reflected light principle enables the use of ac coupled amplifiers. As a result, all tapes can be read interchangeably, whether punched or printed, colored or transparent, without amplifier bias adjustments. Not a single variable component is used.

For further information, *write* Omnitronics Inc. (a Borg-Warner subsidiary), 511 N. Broad St., Philadelphia 23, Pa.

300 Volt Relays Require Significantly Less Space

SPACE savings in the GE 300 volt, 10 ampere, industrial relay (CR 120A) are made possible by a design that eliminates the need for a wiring trough.

The sides of the relays form the trough, and the cover snaps into the slots at the top of each unit. In conventional designs, GE adds, extra space must be allotted on each side to permit wiring the relays. The new relays eliminate the need for this space and the cost of mounting the trough.

The company says all terminals are accessible and easy to wire with a standard screw driver.

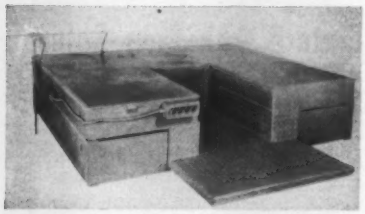
Also available is a two pole adder to build multiple forms. Inventory costs can be reduced by permitting the use of a special form on short notice. Additional flexibility: The units may be changed from normally open to normally closed or vice versa in seconds.

For further information, *write* General Electric Co., Schenectady 5, N. Y.

Lift Table Can Run on Track or Floor Surfaces

MOVEMENTS up and down and forward and back are possible with the Lange lift table. The table can be track mounted or it can run on the floor.

The Automan control arm keeps the table level at all times. One



motor powers the unit. A covered manhole is provided for easy maintenance. Specifications: 84 x 96 in. deck, 22 in. when in lowered position, 40 in. in raised position, 30,000 lb capacity.

For further information, *write* Lange Lift Co., 4225 N. 124th St., Milwaukee 22, Wis.

Automatic Tension Rewind Is Job for Drive System

AN AUTOMATIC tension rewind is suited to applications involving plastic, paper, or metal winding where the material requires accurate tension control as it builds up the radius on the reel.

The setup (called Centerwind Drive) eliminates the need for touching the material with dancers or other mechanical tension sensing devices. The tension can be set at any desired level for constant or tapered tension winding. It's especially valuable where the rewind is taking up freshly printed material or material with low strength characteristics. The Centerwind keeps the tension within the strength limitations of the web, and avoids tearing and helps assure even tracking at all times. Damage to the edges of the rolled material is minimized. The Centerwind is synchronized automatically with line speed by a variable, ac frequency provided by the U. S. Varidyne power unit.

On a restart during the winding operation, the system automatically starts at the exact speed of the stop. The company says recalibration or hunting for the correct speed is eliminated.

For further information, *write* U. S. Electrical Motors Inc., P. O. Box 2058, Terminal Annex, Los Angeles 54, Calif.

Epoxy Adhesive Cures Fast

AN EPOXY adhesive that cures in 60 seconds at room temperature (45 seconds with infrared heat) has been developed.

The maker says the material, known as Minit-Cure, is ideal for automatic meter-mixing-dispensing units in rapid production line work. Applications include bonding metal to metal, plastic to metal, plastic to plastic, or any other porous or nonporous surfaces.

For further information, *write* Allaco Products, 238 Main St., Cambridge 42, Mass.

Cutter Compensation Extra On Numerical Control

YOU CAN machine accurately with cutting tools varying as much as 0.050 in. from the programed diameter with the optional cutter compensation control available on the Bendix DynaPath-20 series numerical contouring controls. It permits the machine operator to use reground tools or to make both roughing and finishing cuts with the same tool and the same tape.

The system generates a secondary signal which is superimposed on the command signals that operate the machine's servodrives. The required correction is proportioned to each axis, producing a normal offset regardless of the direction or curvature of the cutter path.

The difference between actual and programed cutter size and the direction in which compensation is to be made is indicated on two controls mounted on the operator's console. The setting can also be programed into the tape.

For further information, *write* Industrial Controls Section, Bendix Corp., 21820 Wyoming Ave., Detroit 37, Mich.

Portable Arcwelders Rated at 250, 295 Amperes

HEAVY duty, fan cooled arcwelders rated at 250 and 295 amperes (Models 41 and 42) are designed for users who require heavy duty output, but seek the economy of limited input.

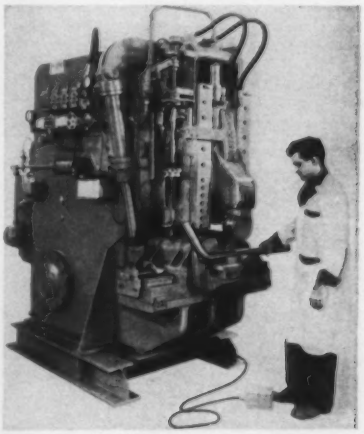
Each unit has rubber wheels and a handle for easy portability. The transformer has precision wound, copper coils over a laminated silicon steel core for easy starting and smoother operation.

For further information, *write* Twentieth Century Mfg. Co., 9250 Access Rd., Minneapolis, Minn.

Tube Bender Fast On Diameters to 4 in.

FAST production rates on parts such as large diameter truck and automobile exhaust pipes and tail pipes are possible with the Pines Model 30T and 40T benders. Bends are formed progressively, in a single pass.

Smooth, good quality bends are



produced by the Model 30-T press on work up to 3 in. OD x 0.125 in. wall steel tubing. The Model 40T handles work up to 4 in. in diameter with an 0.083 in. wall.

The manufacturer says the machines have the bending force to efficiently handle laminated tubing (one tube inside another) or heavy wall, boiler tubing. Production speeds up to 800 bends an hour are attained.

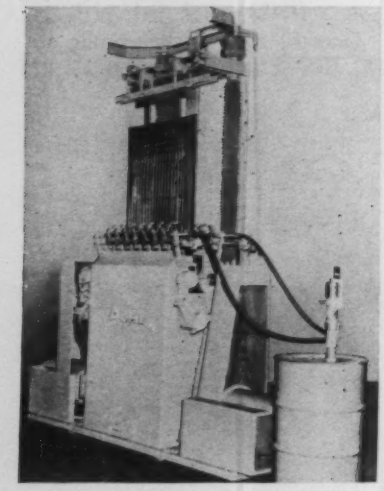
For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

Unit Polishes, Buffs Irregular Shapes

BOTH SIDES of flat, angular, or irregular shapes can be finished simultaneously on Acme's versatile, high production, vertical, polishing and buffing machine.

The unit can accommodate parts up to 48 in. long and 36 in. wide. Length can be incrementally adjusted for parts under 48 in. Two or more parts 18 in. or less in width can be finished simultaneously. If only one side of the part requires finishing, parts such as flat sheets can usually be placed back to back to double the production rate.

Parts suited for the machine include flat sheets, round or polygon shaped tubes, shafts, heat exchanger plates, diecastings, hatchet blades, and other irregular shapes were surfaces to be finished are approximately in line with the axis of the finishing rolls.



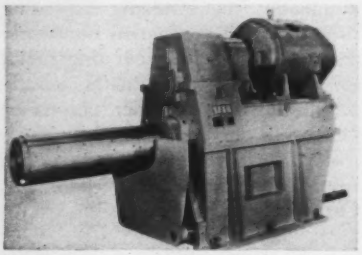
For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Strip Recoiler Has Automatic Speed Control

AUTOMATIC speed adjustment on the Seco Recoiler maintains constant strip speed required by the slitter or processing line. The variable speed, 100 hp, dc drive motor is regulated by a tachometer generator signal roll on the moving strip.

The block is mounted on the outputshaft of the gear reducer drive which is completely enclosed in a special housing. The outputshaft rotates in antifriction bearings.

The outputshaft is proportioned for the overhung load of a 40,000 lb coil. Maximum coil width is 54 in. A built-in, bottom mounted, hydraulic coil pusher removes the coils from the automatic hydraulic block.

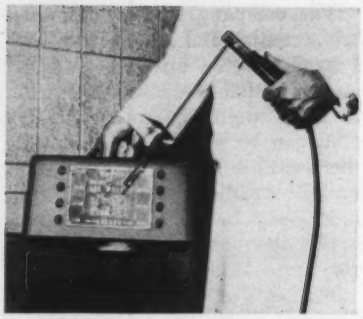


For further information, *write* Steel Equipment Co., 20805 Aurora Rd., P. O. Box 737, Cleveland 22, Ohio.

Light, Portable Unit Welds ½ in. Plates

SMALL work production, industrial maintenance, and utility jobs are applications for a 125 ampere, portable arcwelder. Weight: 45 lb. Dimensions are 16 x 12 x 9 in.

The unit can weld anything from light sheet metal to ½ in. plates, the maker says. No special electrodes are required. Welding range is from 25 to 125 amperes in 12 heat stages, and the unit operates



from any 115 to 230 volt, ac line, with 75 volts open circuit for easy arc starting.

The company says a major feature is the fan cooled, transoidal transformer which keeps the heavy duty windings ventilated and supplies high efficiency with a low weight factor. In addition, the tape wound core construction insures quiet operation and long life.

For further information, *write* Bren/Weld Sales Inc., 5114 Third Ave., Brooklyn 20, N. Y.

Fixture with Jaws Solves Transfer Machine Problems

A FEATURE of a 13 station, 26½ ft long, three section transfer machine is the design of the work fixtures.

Parts are transferred from station to station with a pawl type rotating bar transfer mechanism that slides parts on rails. Clutch housings are clamped from the inside in work fixtures with clamps that bear on the top of a concealed flange.

To solve the problem of lowering the jaws after machining (so that the part is free to slide on the transfer rails between stations) a fixture with disappearing jaws is used on the transfer machine.

The jaw in each fixture is a one-piece detail that bears on three points on the concealed housing flange. It is operated by double eccentrics actuated by a hydraulic cylinder through a rack and pinion drive and a gear train. The jaw can raise, travel sideways, and lower to clamp the parts; then raise, move sideways and lower into the fixture to clear the part for the transfer operation.

The unit mills, orients, drills, chamfers, reams, and taps cast iron automotive clutch housings at a rate

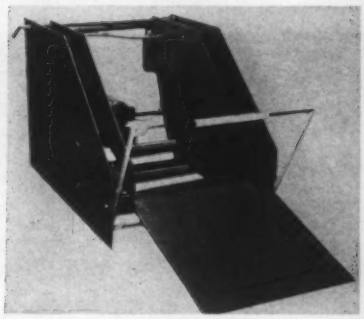
of 150 pieces per hour at 100 per cent efficiency.

For further information, *write* Snyder Corp., 3400 E. Lafayette, Detroit 7, Mich.

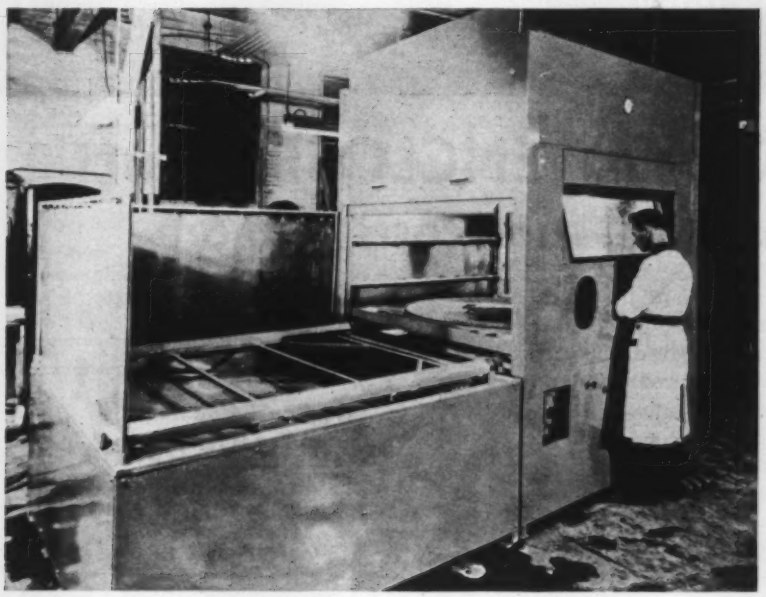
Coil Cradle Takes 30 in. Widths at Slow Speeds

MATERIAL up to 30 in. wide can be handled at slow speeds by a modified Medelton R-304 Poweroll coil cradle. The worm gear speed reducer produces a maximum speed of 10 fpm.

The unit is demand controlled by a combination actuator switch and loop control which operates on 90 per cent captive air. A special electrical control box (on the rear on the unit) provides forward or reverse operation, and has an off position for loading safety.



For further information, *write* Medelton Co. Inc., 262 E. Third St., Mt. Vernon, N. Y.



Unit Wet Blasts King Sized Parts

THIS wet blast unit and work handling device is designed for finishing large, heavy workpieces such as plastic molds, rubber molds, glass molds, diecasting dies, forging dies, and large jet engine components.

Work is placed on the rotary table, then manually pushed into the cabinet for processing. Following wet blasting, the rotary table is returned to its position over the Rollo-Table attachment, rinsed of residual abrasive, and removed.

The pressure blast cabinet (fabricated of 304L stainless) is 70 in. wide, 70 in. deep, and 108 in. high. Three connections are required for operation: Electrical (110 volts), water (½ in.), and compressed air (¾ in.). No exhaust or permanent drain connection is required.

For further information, *write* Pressure Blast Mfg. Co. Inc., 27 Pleasant St., Manchester, Conn.

NEW literature

Write directly to the company for a copy

Abrasive Belt Chart

A chart (13 x 17 in.) discusses abrasive belts and contact wheels for metal, glass, wood, and plastic applications. It covers abrasive, belt speed, lubricant, and contact wheel type for grinding, finishing, and polishing. Coated Abrasives Div., Armour Alliance Industries, 16123 Armour St., Alliance, Ohio.

Investment Castings

"How to Design Precision Investment Castings" describes the benefits and limitations of the lost wax, investment casting process. The pocket sized book is a revised second edition. In addition to a process description, the book also gives a detailed description of basic design principles. Midwest Precision Castings Co., 10703 Quincy Ave., Cleveland 6, Ohio.

Commercial Glasses

Expanded information on corrosion resistance and thermal expansion of 32 commercial glasses is included in a revised booklet, "Properties of Selected Commercial Glasses." Ask for Bulletin B-83. Corning Glass Works, Corning, N. Y.

Hard Surfacing Deposits

A data sheet describes finishing of Colmonoy hard surfacing alloy deposits. Specific grinding wheel recommendations for nickel base, cobalt base, and iron base alloys are presented in tabular form. Wall Colmonoy Corp., 19345 John R Street, Detroit 3, Mich.

Stainless Machining Chart

A stainless steel machining chart, Sec. A, No. 5, provides a table of recommended machining rates for 37 types of stainless steel (PH grades included). Ten machining operations are covered. Turning rates are detailed for automatic, heavy duty spindle, turret, and Swiss type lathes. Peter A. Frasse & Co. Inc., 17 Grand St., New York 13, N. Y.

Meehanite Dies, Molds

Meehanite dies and molds are covered in a 16 page brochure. Included are photographs of applications and an analysis of properties. Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.

Trimethoxyboroxine

Properties, uses, and handling of Trimethoxyboroxine (TMB) are discussed in a 12 page bulletin. Typical applications: Metals fire extinguishant, primary curing agent for epoxy resins, and as an agent for nitrogen removal from refinery feed stocks. Specify Bulletin CT-520. Callery Chemical Co., Callery, Pa.

Square D TOTALLY ENCLOSED Duct*

takes less space—*and costs no more*

*(low impedance)

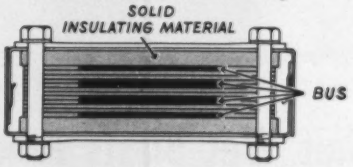
Ventilated bus duct is bulky and awkward. It's difficult—sometimes impossible—to install it in restricted areas. The layers of insulation around the bus bars and the necessary air spaces contribute to large, inconvenient size.

Square D totally enclosed feed-in duct solves the space problem. Solid sheets of insulation permit mounting bus bars only ¼" apart. This solid insulating material is also an effective heat conductor, thus eliminating the need for air spaces. The result—Square D low-impedance duct is as much as 50% smaller than ordinary duct. It can be used where no other duct fits. It makes expansion of existing electrical systems easier, new construction planning simpler. Best of all, Square D low-impedance bus duct is totally enclosed. Having no ventilation holes, it's safe from physical damage and dust accumulation. Needing no ventilation, it can be mounted in any position without de-rating.

Doesn't it make sense, when buying feed-in duct, to specify a product that will meet all your requirements? Square D totally enclosed low-impedance duct costs no more—why settle for less?

Here's Why Square D's EXCLUSIVE Design

makes ventilation and increased bus bar size unnecessary



The entire space within the duct and between the bus bars is filled with a solid insulating material which conducts the heat to the surface. There are no dead air spaces inside the duct. Square D totally enclosed low-impedance duct meets U/L requirements for temperature rise with no larger bus bars (hence, no higher cost) than ventilated duct.

SQUARE D COMPANY

wherever electricity is distributed and controlled

Strong Second Half Expected

LOOK for steelmakers to produce about 45 million ingot tons in the first half—17 per cent more metal than they melted in the second half of 1960.

The steady uptrend in production that started 11 weeks ago will continue through most of June before leveling off. This week's output will slightly exceed the 2,080,000 ingot tons that STEEL estimates the industry poured in the week ended May 27. May production will be close to 9 million tons, up sharply from last month's 7.6 million and the largest for any month since April, 1960. STEEL estimates that industry operations are at 72 per cent of 1960 capacity.

NEARING PLATEAU— Market analysts expect third quarter production to be close to the 25 million ingot tons that will be poured this quarter. Reason: Users have pared their inventories to the bone and will have to take in as much new steel as they consume during the period. Consumption will be at a peak in two important market areas—construction and canning. Despite vacations in many metalworking plants and model changeovers in the automotive industry, third quarter consumption will probably equal the 18 million to 19 million tons of finished steel that will be consumed this quarter.

FOURTH QUARTER UPTURN— Weekly production isn't likely to climb above 2.3 million ingot tons (80 per cent of capacity) during the third quarter, but it's almost sure to do so in the fourth. Reasons:

1. Automakers will be turning out new models at a high rate. 2. Other manufacturers of consumer durable goods will be stepping up their output to meet improved demand generated by a broad economic recovery. 3. Spending for capital equipment will increase markedly—three months before an upturn was forecast originally. 4. Some buyers will start building inventories—either because mill deliveries are lengthening, or because there could be a steel strike in mid-1962. Steelmaking operations won't climb into the 80 per cent bracket until users start building inventories at the rate of about 1 million tons a month. That may happen by November.

100 MILLION TONS— Assuming fourth quarter ingot production of 30 million tons, second half output will be 55 million tons and the year's total 100 million (vs. 99.3 million in 1960). The first half of 1962 will probably be stronger than this year's second half, largely because of heavy inventory building. Users will hedge against the possibility of a strike, just as they did in the first half of 1959. T. F. Patton, president, Republic Steel Corp., believes that weekly output during the first half of next year may average 2.4 million tons. If it does, aggregate production for the period will be 62.4 million tons—third highest in the industry's history.

STAINLESS BRIGHTENS— May shipments of stainless and heat resisting steels will be 15 to 20 per cent higher than last month's, thanks to improved demand from automakers, appliance manufacturers, and distributors. The upturn is more than welcome. First quarter shipments of cold rolled stainless strip were the lowest of any three month period since the second quarter of 1958. Shipments for the year—of strip and all other products—are now expected to equal last year's 579,000 tons. By quarters: 127,000 tons, 145,000, 142,000 and 165,000.

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*Current prices were published in the May 22 issue and will appear in subsequent issues.

PRECISE TUBING HELPS HANDLE HOT STUFF

Juggling radioactive materials takes a pair of sure hands—sure mechanical hands. Malfunctions cannot be tolerated. All components must adhere to rigid specifications and operate together perfectly. A good application for precise tubing.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. P-6 describes our platinum products. Write for them.

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* MALVERN, PENNSYLVANIA

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

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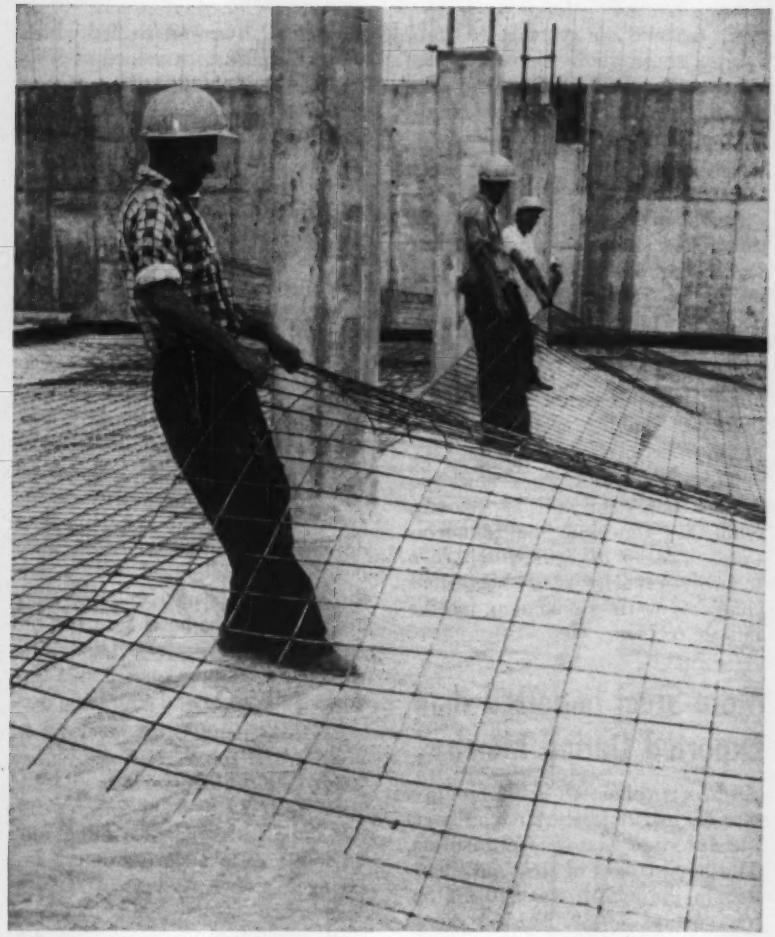


Source: Wire Reinforcement Institute Inc.

More reinforcement uses are the aim, as . . .

New Markets Are Sought For Welded Wire Fabric

NEW MARKETS for welded wire fabric are being eyed by marketers, engineers, and construction material specialists at the American Steel & Wire Div., Cleveland, U. S. Steel Corp.

The search was prompted by the success achieved in New York in the use of the fabric in a college library in the Bronx and in long span construction in a 12 story Manhattan apartment project.

Welded wire fabric (often called wire mesh) has long been used to reinforce concrete in streets and highways, airport taxiways, pipe, and short span concrete buildings.

It also has been utilized more recently to reinforce asphalt pavements.

• **Ten Areas Considered** — Being studied as potential market outlets for fabric are:

1. Flat slab, flat plate, and similar type buildings. (A flat slab is one that is nearly as wide as it is long, and it is supported at four corners by columns. There are no beams running between the columns. It could be called a two way slab, as its approximately square shape induces the stresses in both directions. A flat slab differs from a flat plate only by the addition of drop panels—a thickening of the slab at the points where the columns come in.)
2. Reinforcement of one way slabs. (This type of slab has one span so much larger than the span in the other direction that it can be assumed to be supported only on its long sides. The description "one way" indicates that the principal stresses are in one direction only.)
3. Reinforcement of slabs where only the transverse wires of the fabric are required, as in buildings where additional negative steel (placed in the top of the slab over the supports) is required.
4. Reinforcement of poured-in-place concrete walls, including retaining walls.
5. Reinforcement of precast concrete building walls which are erected by "tilt up" methods.
6. Reinforcement of concrete footings.
7. Reinforcement of bridge decks, piers, and abutments.
8. Reinforcement of concrete tunnels.
9. Reinforcement of thin shell architectural shapes.
10. Shear reinforcement in the webs of prestressed or reinforced concrete beams.

• **Some Code Changes Needed**— The American Steel & Wire specialists quickly admit they do not expect an immediate heavy demand for welded wire fabric for all of those applications. In addition to the job of acquainting designers and engineers with the use of the material in new applications, it will be necessary in some areas and for some applications to seek building code revisions to permit use of the fabric.

Evidence, though, leads the American Steel & Wire people to believe that they will be able to market welded wire fabric successfully for a wide range of new applications.

Carpenter Adds Seamless Stainless Pipe, Tubing

Carpenter Steel Co.'s Alloy Tube Div., Union, N. J., will begin marketing extruded seamless stainless tubing and pipe June 1. More than 500,000 lb of the products in various sizes and stainless grades, including Mel-Trol steels, are in production. They will be available for immediate delivery from the division's warehouse at Union, N. J., and branch warehouses or distributors throughout the country.

For the last 33 years, Carpenter's Alloy Tube Div. has been a major producer of welded stainless steel and alloy tubing and pipe. It is entering the seamless tube and pipe market because of improved manufacturing methods made possible by the patented Ugine-Sejournet extrusion process.

To accommodate increased production and warehousing requirements for seamless products, a 25,000 sq ft addition was recently completed at the Union, N. J., tube mill.

All extruded seamless products will be cold finished. Warehouse stocks will initially consist of stainless Types 304, 316, and 347. They are augmented by mill process stocks of 304L, 316L, 321, and Carpenter No. 20CB. Seamless tubing sizes in stock will range from 1/4 through 6 5/8 in. O.D., with wall thickness up to 7/8 in. Pipe sizes will include 1/8 through 6 in. Stocks will also include heat exchanger tubes 5/8 to 1 in. O.D., with wall thickness ranging 0.049 to 0.065.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 104 & 105

Despite the recent improvement in demand for sheets, mill deliveries remain about the same as they've been for some time. Hot rolled sheets are still available for shipment in three weeks, and even better can be done in a few instances. Cold rolled sheets are being promised for shipment in four to five weeks, and that delivery can be bettered where hot bands are in stock. Enameling stock is available in 30 days.

Galvanized sheet deliveries continue well extended, with some sellers sold out through July. However, demand for corrugated galvanized sheets shows signs of slackening as June nears. Farmers, who use this grade of sheets for buildings, are busy in the fields and are not expected to get back to their repairwork until late in July.

Mill bookings of both hot and cold rolled sheets are ahead of last month's, and a further gain is expected in June. Orders on mill books for July shipment are better than they were 60 days ago. Some customers are beginning to order ahead, but this is not so much for inventory buildup as it is to meet prompt needs.

Republic Steel Corp.'s new $55 million hot strip mill at Warren, Ohio, has gone into limited operation. The 56 in. mill will have a monthly capacity of 145,000 tons compared with 85,000 tons for the mill it replaces.

More Steel Imported than Exported During March

Imports of steel mill products topped exports in March, reports the American Iron & Steel Institute. The import total of steel mill products in the month was 210,654 net tons valued at $27,374,968, while exports amounted to 168,443 tons valued at $37,627,846.

First quarter imports totaled 508,312 tons valued at $68,204,759. That compares with 1,390,721 tons valued at $188,083,519 in the same period a year ago. Exports in the first quarter this year amounted to 447,934 tons valued at $99,224,041 vs 528,006 tons valued at $115,112,434 in the same period last year.

Imports of iron and steel (including fabricated steel items, iron products, and ferroalloys) in March totaled 259,286 tons valued at $35,812,758 bringing the first quarter total to 617,466 tons valued at $90,509,075. Intake in March, 1960, was 510,330 tons valued at $73,456,258, bringing the total for the first three months of 1960 to 1,540,472 tons valued at $220,583,829.

Exports of all iron and steel products (including fabricated items, pig iron, and ferroalloys) in March totaled 212,056 tons valued at $50,750,225, to bring the three months total to 613,225 tons valued at $137,791,065. In March, 1960, exports of all iron and steel products totaled 235,678 tons valued at $58,478,874 making the first quarter (1960) total 634,926 tons valued at $153,204,723.

Imported Steel Prices at Great Lakes Ports Cut

While prices are higher on merchant bars and nails imported from Western Europe, quotations on most other imported steel products have weakened noticeably, particularly at Great Lakes ports.

Deformed bars are off at those ports $8 a ton, while they are off only about $4 in most other coastal areas. Bar sized angles have dropped $4 a ton at the lake ports but are unchanged elsewhere. Structurals, I-beams, and channels are down at lake ports $6 a ton but only $2 in other areas. Plates for shipment to the Great Lakes are down $4 but only $2 to other ports.

Furring channels are weak in all areas except the West Coast, where prices are slightly higher. Barbed wire is off $2 to $4 a ton depending on district. Bands are quoted $4 lower at lake ports but are unchanged elsewhere.

Strength is noted in merchant bars, which are up $2 to $6 a ton; also in nails, which are $3 to $8 a ton higher. Both Thomas and open hearth wire rods are quoted up $1 at lake ports, with open hearth rods down $1 on the West Coast.

Plates . . .

Plate Prices, Page 103

Deliveries on sheared plates are beginning to get a little more extended. While ten day delivery is still possible, shipments generally run two to three weeks. Killed steel grades command three to four weeks, and shipments of certain alloy specialties take five to six weeks.

Shipwork is a little more active, due primarily to increased buying by the Sun Shipbuilding & Dry Dock Co., Chester, Pa. Railroad requirements continue limited. Two leading roads, the Pennsylvania and the Norfolk & Western, appear to have little work in prospect before late summer. The chemical and food processing equipment makers are specifying plates

fairly freely, while missilework and other defense requirements are providing fair volume.

One Midwestern platemaker reports it is in receipt of fair tonnage from barge builders. Also, the machinery makers have been doing a little buying, and there's a fair movement of tonnage to construction equipment builders.

Plate fabricators on the Pacific Coast report only small jobs are in sight. Standard Oil Co. of California is planning a refinery on the Kenai Peninsula, Alaska. The largest pending contract in the Pacific Northwest involves 1200 tons of plates for the Vernon Water District, Portland, Oreg.

Freight Car Orders Gain Slightly During April

Domestic freight car buying in April increased slightly over that of the preceding month, 2040 cars vs. 1796, reports the American Railway Car Institute and the Association of American Railroads. April bookings, however, were down substantially from those in the corresponding month of 1960, when 5540 cars were ordered.

April deliveries totaled 2933 cars compared with 3874 units in March and 5569 in April a year ago.

Backlogs as of May 1 included 9762 cars on order in railroad shops and 3896 in commercial car shops, aggregating 13,658 units. That compares with 15,801 cars on Apr. 1 and 41,003 on May 1 a year ago.

Steel Ingot Production Reaches 12 Month High

STEEL PRODUCTION is ahead of the year ago pace, and the gap is expected to widen at least through the July 4 holiday week. The steady uptrend, which started at the beginning of the year, shows no sign of abating. A year ago, the production trend was equally steady, —but in the opposite direction.

Based on estimates by STEEL, production increased 2.1 per cent during the week ended May 27 to 2,080,000 tons. It was the largest weekly total since the week ended May 14, 1960, when 2,102,000 tons were turned out.

• **Buffalo** — Production made another advance—to about 73.3 per cent of 1960 capacity. Republic Steel Corp. relighted an open hearth furnace and is operating five of its nine units. Bethlehem Steel Co. continues to operate 24 of 35 open hearths; Wickwire Spencer Div., Colorado Fuel & Iron Corp., one of three.

• **Youngstown**—Steelmaking operations reached an estimated 54 per cent of 1960 capacity in the week ended May 27, a gain of about 2 points. The climb in production is attributed to a steady rise in demand. Some executives are concerned about the impact of plant-wide vacations of consumers on steel buying during July and August. U. S. Steel Corp. added an open hearth furnace at its Ohio Steel Works and is considering the possibility of adding a blast furnace to supply more hot metal for its steelmaking operations.

• **Los Angeles**—With Kaiser Steel Corp.'s operating rate up 6 points, the Western District operating rate rose to 78.6 per cent of 1960 capacity in the week ended May 27.

• **Philadelphia**—Ingot production in the Northeastern District is the highest since last May. Output for the week ended May 20 (the latest officially reported) was 288,572 tons.

• **Birmingham**—Steelmaking in the Southern District rose about 5½ points during the week ended May 29 to 69.5 per cent of 1960 capacity.

• **Pittsburgh** — Operations dropped about 1 point here during the week ended May 27 to about 62.5 per cent of capacity. Pittsburgh Steel Co. took one open hearth out of service at its Monessen (Pa.) Works and is operating six of 12 furnaces.

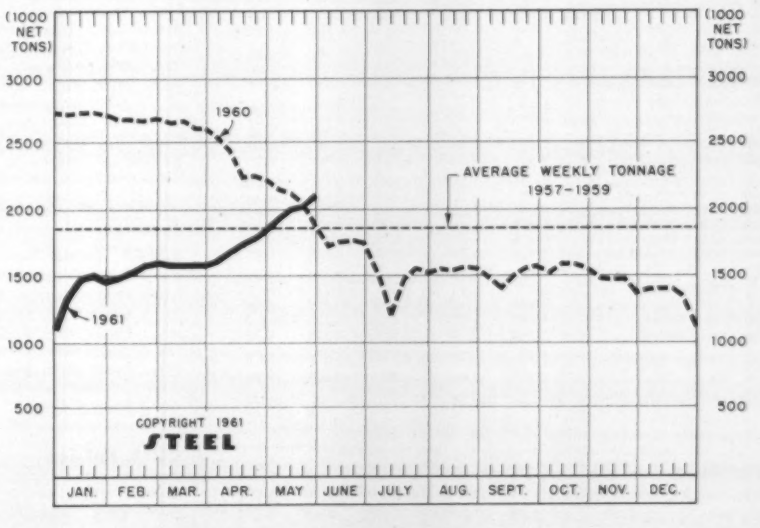
• **Cleveland**—Production will increase further during the week ending June 3 as the result of relighting of two open hearth furnaces by U. S. Steel Corp. at its Lorain (Ohio) Works. The additional unit went into production May 28.

STEEL INGOT PRODUCTION

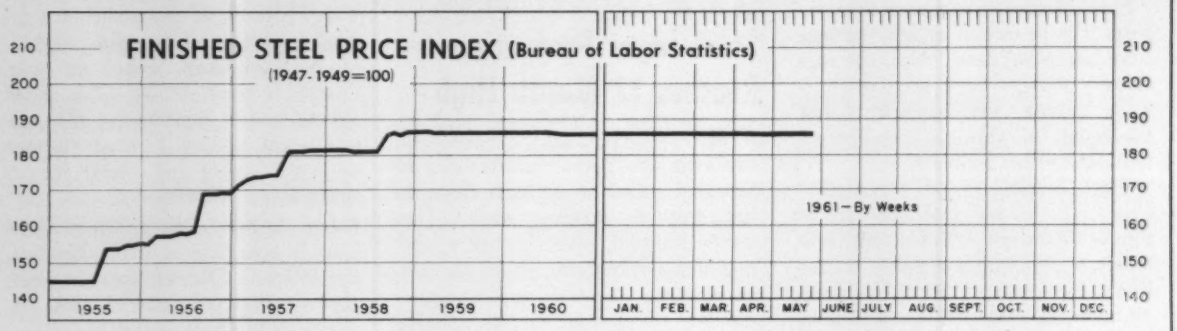
Weeks Ended	Net Tons	Change
May 27	2,080,000*	+ 2.1%
May 20	2,037,000	+ 2.5%
May 13	1,988,000	+ 2.3%
Totals to May 20		
1961	33,012,000	−34.0%
1960	50,010,000	

DISTRICTS	Week Ended May 20 Tons‡	Week Ended May 20 Index†	Week Ended May 13 Index†
Northeastern	288,572	108	105
Buffalo	114,879	118	120
Pittsburgh	375,301	93	92
Youngstown	166,581	98	96
Cleveland	113,892	123	124
Detroit	140,589	134	128
Chicago	422,706	113	106
Cincinnati	87,470	116	115
St. Louis	64,111	122	114
Southern	112,732	104	106
Western	149,649	128	127
Industry	2,037,000	109.3	106.7

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



May 23, 1961	Week Ago	Month Ago	May Index	Year Ago
186.1	186.1	186.1	186.1	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	May 24 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.98
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.27
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	36.33	36.33	37.33	33.33	50.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 24 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 1/2-5/8" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	May 24 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$35.50	$33.50	$48.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	40.00	35.00	51.50
No. 1 Heavy Melt, Chicago	35.50	35.50	36.50	31.50	50.50
No. 1 Heavy Melt, Valley	37.50	37.50	36.50	32.50	53.50
No. 1 Heavy Melt, Cleve.	34.50	34.50	33.50	31.50	49.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	30.50	51.50
Rails, Rerolling, Chicago	57.50	57.50	59.50	52.50	71.50
No. 1 Cast, Chicago	41.50	41.50	43.50	42.50	47.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, May 24, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 104; footnotes, page 106.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall, Pa. U5 ..... $76.00

INGOT, Alloy (NT)
Detroit S41 ..... $82.00
Economy, Pa. B14 ..... 82.00
Farrell, Pa. S3 ..... 82.00
Lowellville, O. S3 ..... 82.00
Midland, Pa. C18 ..... 82.00
Munhall, Pa. U5 ..... 82.00
Sharon, Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville, Ill. K4 ..... $82.00
Bessemer, Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton, Pa. U5 ..... 80.00
Ensley, Ala. T2 ..... 80.00
Fairfield, Ala. T2 ..... 80.00
Fontana, Calif. K1 ..... 90.50
Gary, Ind. U5 ..... 80.00
Johnstown, Pa. B2 ..... 80.00
Lackawanna, N.Y. B2 ..... 80.00
Munhall, Pa. U5 ..... 80.00
Owensboro, Ky. G8 ..... 80.00
S. Chicago, Ill. R2, U5 ..... 80.00
S. Duquesne, Pa. U5 ..... 80.00
Sterling, Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton, O. R2 ..... 102.00
Clairton, Pa. U5 ..... 99.50
Conshohocken, Pa. A3 ..... 99.50
Ensley, Ala. T2 ..... 99.50
Fairfield, Ala. T2 ..... 99.50
Farrell, Pa. S3 ..... 99.50
Fontana, Calif. K1 ..... 109.00
Gary, Ind. U5 ..... 99.50
Geneva, Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown, Pa. B2 ..... 99.50
Lackawanna, N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland, Pa. C18 ..... 99.50
Munhall, Pa. U5 ..... 99.50
Owensboro, Ky. C8 ..... 99.50
Seattle B3 ..... 109.00
Sharon, Pa. S3 ..... 99.50
S. Chicago R2, U5, W14 ..... 99.50
S. Duquesne, Pa. U5 ..... 99.50
S. SanFrancisco B3 ..... 109.00
Warren, O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem, Pa. B2 ..... $119.00
Bridgeport, Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton, O. R2, T7 ..... 119.00
Conshohocken, Pa. A3 ..... 121.00
Detroit S41 ..... 119.00
Economy, Pa. B14 ..... 119.00
Farrell, Pa. S3 ..... 119.00
Fontana, Calif. K1 ..... 140.00
Gary, Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind. Harbor, Ind. Y1 ..... 119.00
Johnstown, Pa. B2 ..... 119.00
Lackawanna, N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville, O. S3 ..... 119.00
Massillon, O. R2 ..... 119.00
Midland, Pa. C18 ..... 119.00
Munhall, Pa. U5 ..... 119.00
Owensboro, Ky. G8 ..... 119.00
Seattle(6) B3 ..... 140.00
Sharon, Pa. S3 ..... 119.00
S. Chicago R2, U5, W14 ..... 119.00
S. Duquesne, Pa. U5 ..... 119.00
Struthers, O. Y1 ..... 119.00
Warren, O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton, O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary, Ind. U5 ..... 122.50
S. Chicago, Ill. R2, W14 ..... 122.50
S. Duquesne, Pa. U5 ..... 122.50
Warren, O. C17 ..... 122.50

SKELP
Aliquippa, Pa. J5 ..... 5.05
Benwood, W. Va. W10 ..... 5.05
Ind. Harbor, Ind. Y1 ..... 5.05
Munhall, Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren, O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity, Ala. R2 ..... 6.40
Aliquippa, Pa. J5 ..... 6.40
Alton, Ill. L1 ..... 6.60
Bartonville, Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora, Pa. A7 ..... 6.40
Fairfield, Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor, Ind. Y1 ..... 6.40
Johnstown, Pa. B2 ..... 6.40
Joliet, Ill. A7 ..... 6.40
KansasCity, Mo. S5 ..... 6.65
Kokomo, Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa, Colo. C10 ..... 6.65
Monessen, Pa. P7 ..... 6.40
Pittsburg, Calif. C11 ..... 7.20
Portsmouth, O. P12 ..... 6.40
Roebling, N.J. R5 ..... 6.50
S. Chicago, Ill. R2, W14 ..... 6.40
SparrowsPoint, Md. B2 ..... 6.50
Sterling, Ill. (1) N15 ..... 6.40
Sterling, Ill. N15 ..... 6.50
Struthers, O. Y1 ..... 6.40
Worcester, Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity, Ala. R2 ..... 5.50
Aliquippa, Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer, Ala. T2 ..... 5.50
Bethlehem, Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton, Pa. U5 ..... 5.50
Fairfield, Ala. T2 ..... 5.50
Fontana, Calif. K1 ..... 6.30
Gary, Ind. U5 ..... 5.50
Geneva, Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind. Harbor, Ind. I-2, Y1 ..... 5.50
Johnstown, Pa. B2 ..... 5.55
Joliet, Ill. P22 ..... 5.50
KansasCity, Mo. S5 ..... 5.60
Lackawanna, N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa, Colo. C10 ..... 5.80
Munhall, Pa. U5 ..... 5.50
Niles, Calif. P1 ..... 6.25
Phoenixville, Pa. P4 ..... 5.55
Portland, Oreg. O4 ..... 6.25
Seattle B3 ..... 6.20
S. Chicago, Ill. U5, W14 ..... 5.50
S. SanFrancisco B3 ..... 6.15
Sterling, Ill. N15 ..... 5.50
Struthers, O. Y1 ..... 5.50
Torrance, Calif. C11 ..... 6.20
Weirton, W. Va. W6 ..... 5.50

Wide Flange
Bethlehem, Pa. B2 ..... 5.55
Clairton, Pa. U5 ..... 5.50
Fontana, Calif. K1 ..... 6.45
IndianaHarbor, Ind. I-2 ..... 5.50
Lackawanna, N.Y. B2 ..... 5.55
Munhall, Pa. U5 ..... 5.50
Phoenixville, Pa. P4 ..... 5.55
S. Chicago, Ill. U5 ..... 5.50
Sterling, Ill. N15 ..... 5.50
Weirton, W. Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall, Pa. U5 ..... 6.80
S. Chicago, Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa, Pa. J5 ..... 8.05
Bessemer, Ala. T2 ..... 8.06
Bethlehem, Pa. B2 ..... 8.10
Clairton, Pa. U5 ..... 8.05
Fairfield, Ala. T2 ..... 8.05
Fontana, Calif. K1 ..... 8.85
Gary, Ind. U5 ..... 8.05
Geneva, Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind. Harbor, Ind. I-2, Y1 ..... 8.05
Johnstown, Pa. B2 ..... 8.10
KansasCity, Mo. S5 ..... 8.15
Lackawanna, N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall, Pa. U5 ..... 8.06
Phoenixville, Pa. P4 ..... 8.10
Seattle B3 ..... 8.80
S. Chicago, Ill. U5, W14 ..... 8.06
S. SanFrancisco B3 ..... 8.70
Sterling, Ill. N15 ..... 7.75
Struthers, O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem, Pa. B2 ..... 8.10
Ind. Harbor, Ind. I-2 ..... 8.05
Lackawanna, N.Y. B2 ..... 8.10
Munhall, Pa. U5 ..... 8.05
S. Chicago, Ill. U5 ..... 8.05
Sterling, Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem, Pa. B2 ..... 5.55
Ind. Harbor, Ind. I-2 ..... 5.50
Lackawanna, N.Y. B2 ..... 5.55
Munhall, Pa. U5 ..... 5.50
S. Chicago, Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind. Harbor, Ind. I-2 ..... 6.50
Lackawanna, N.Y. B2 ..... 6.50
Munhall, Pa. U5 ..... 6.50
S. Chicago, Ill. I-2, U5 ..... 6.50
Weirton, W. Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity, Ala. R2 ..... 5.30
Aliquippa, Pa. J5 ..... 5.30
Ashland, Ky. (15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer, Ala. T2 ..... 5.30
Clairton, Pa. U5 ..... 5.30
Claymont, Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville, Pa. L7 ..... 5.30
Conshohocken, Pa. A3 ..... 5.30
Ecorse, Mich. G5 ..... 5.30
Fairfield, Ala. T2 ..... 5.30
Farrell, Pa. S3 ..... 5.30
Fontana, Calif. (30) K1 ..... 6.10
Gary, Ind. U5 ..... 5.30
Geneva, Utah C11 ..... 5.30
GraniteCity, Ill. G4 ..... 5.40
Houston S5 ..... 5.40
Ind. Harbor, Ind. I-2, Y1 ..... 5.30
Johnstown, Pa. B2 ..... 5.30
Lackawanna, N.Y. B2 ..... 5.30
Mansfield, O. E6 ..... 5.30
Minnequa, Colo. C10 ..... 6.15
Munhall, Pa. U5 ..... 5.30
Newport, Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale, Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon, Pa. S3 ..... 5.30
S. Chicago, Ill. U5, W14 ..... 5.30
SparrowsPoint, Md. B2 ..... 5.30
Sterling, Ill. N15 ..... 5.30
Steubenville, O. W10 ..... 5.30
Warren, O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont, Del. P4 ..... 7.05
Fontana, Calif. K1 ..... 7.85
Geneva, Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown, Pa. B2 ..... 7.05
SparrowsPoint, Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy, Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa, Pa. J5 ..... 7.95
Ashland, Ky. A10 ..... 7.95
Bessemer, Ala. T2 ..... 7.95
Clairton, Pa. U5 ..... 7.95
Claymont, Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville, Pa. L7 ..... 7.95
Conshohocken, Pa. A3 ..... 7.95
Economy, Pa. B14 ..... 7.95
Ecorse, Mich. G5 ..... 7.95
Fairfield, Ala. T2 ..... 7.95
Farrell, Pa. S3 ..... 7.95
Fontana, Calif. (30) K1 ..... 8.75
Gary, Ind. U5 ..... 7.95
Geneva, Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind. Harbor, Ind. I-2, Y1 ..... 7.95
Johnstown, Pa. B2 ..... 7.95
Munhall, Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon, Pa. S3 ..... 7.95
S. Chicago, Ill. U5, W14 ..... 7.95
SparrowsPoint, Md. B2 ..... 7.95
Sterling, Ill. N15 ..... 7.625
Warren, O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa, Pa. J5 ..... 7.50
Claymont, Del. P4 ..... 7.50
Coatesville, Pa. L7 ..... 7.50
Economy, Pa. B14 ..... 7.50
Farrell, Pa. S3 ..... 7.50
Fontana, Calif. K1 ..... 8.30
Gary, Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind. Harbor, Ind. Y1 ..... 7.50
Johnstown, Pa. B2 ..... 7.50
Lowellville, O. S3 ..... 7.50
Munhall, Pa. U5 ..... 7.50
Newport, Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon, Pa. S3 ..... 7.50
S. Chicago, Ill. U5, W14 ..... 7.50
SparrowsPoint, Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont, Del. P4 ..... 6.375
Conshohocken, Pa. A3 ..... 6.375
Ind. Harbor, Ind. I-2 ..... 6.375
Munhall, Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S. Chicago, Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..... 5.55
Ashland l.c.l. (15) A10 ..... 6.05
Cleveland c.l. R22 ..... 6.05
Warren, O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala. City, Ala. (9) R2 ..... 5.675
Aliquippa, Pa. (9) J5 ..... 5.675
Alton, Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer, Ala. (9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton, O. (23) R2 ..... 6.15
Clairton, Pa. (9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse, Mich. (9) G5 ..... 5.675
Emeryville, Calif. J7 ..... 6.425
Fairfield, Ala. (9) T2 ..... 5.675
Fairless, Pa. (9) U5 ..... 5.825
Fontana, Calif. (9) K1 ..... 6.375
Gary, Ind. (9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind. Harbor(9) I-2, Y1 ..... 5.675
Johnstown, Pa. (9) B2 ..... 5.675
Joliet, Ill. P2 ..... 5.675
KansasCity, Mo. (9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon, O. (23) R2 ..... 6.15
Midland, Pa. (23) C18 ..... 6.025
Milton, Pa. M18 ..... 5.825
Minnequa, Colo. C10 ..... 6.125
Niles, Calif. P1 ..... 6.375
Owensboro, Ky. (9) G8 ..... 6.025
Pittsburg, Calif. (9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
Riverdale, Ill. (9) A1 ..... 5.675
Seattle(9) A24, B3, N15 ..... 6.425
S. Ch'c'go(9) R2, U5, W14 ..... 5.675
S. Duquesne, Pa. (9) U5 ..... 5.675
S. SanFran., Calif. (9) B3 ..... 6.425
Sterling, Ill. (1) (9) N15 ..... 5.675
Sterling, Ill. (9) N15 ..... 5.775
Struthers, O. (9) Y1 ..... 5.675
Tonawanda, N.Y. B12 ..... 5.675
Torrance, Calif. (9) C11 ..... 6.375
Warren, O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.725
Bethlehem, Pa. B2 ..... 6.725
Bridgeport, Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton, O. R2, T7 ..... 6.725
Clairton, Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy, Pa. B14 ..... 6.725
Ecorse, Mich. G5 ..... 6.725
Farrell, Pa. S3 ..... 6.725
Fontana, Calif. K1 ..... 7.775
Gary, Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind. Harbor, Ind. I-2, Y1 ..... 6.725
Johnstown, Pa. B2 ..... 6.725
KansasCity, Mo. S5 ..... 6.975
Lackawanna, N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville, O. S3 ..... 6.725
Massillon, O. R2 ..... 6.725
Midland, Pa. C18 ..... 6.725
Owensboro, Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon, Pa. S3 ..... 6.725
S. Chicago R2, U5, W14 ..... 6.725
S. Duquesne, Pa. U5 ..... 6.725
Struthers, O. Y1 ..... 6.725
Warren, O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa, Pa. J5 ..... 8.30
Bessemer, Ala. T2 ..... 8.30
Bethlehem, Pa. B2 ..... 8.30
Clairton, Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse, Mich. G5 ..... 8.30
Fairfield, Ala. T2 ..... 8.30
Fontana, Calif. K1 ..... 9.00
Gary, Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind. Harbor, Ind. Y1 ..... 8.30
Johnstown, Pa. B2 ..... 8.30
KansasCity, Mo. S5 ..... 8.55
Lackawanna, N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S. Chicago, Ill. R2, W14 ..... 8.30
S. Duquesne, Pa. U5 ..... 8.30
S. SanFrancisco B3 ..... 9.05
Sterling, Ill. N15 ..... 7.925
Struthers, O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem, Pa. (9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity, Mo. (9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling, Ill. N15 ..... 5.775
Sterling, Ill. (1) N15 ..... 5.675
Tonawanda, N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa, Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet, Ill. P22 ..... 5.675
Minnequa, Colo. C10 ..... 6.125
Niles, Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy, Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity, Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ..... 11.75*
Alloy
Ambridge, Pa. W18 ..... 10.175
BeaverFalls, Pa. M12 ..... 10.175
Camden, N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria, O. W8 ..... 10.175
Monaca, Pa. S17 ..... 10.175
Newark, N.J. W18 ..... 10.35
SpringCity, Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge, Pa. W18 ..... 7.65
BeaverFalls, Pa. M12, R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden, N.J. P13 ..... 8.10
Carnegie, Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, H5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora, Pa. A7 ..... 7.65
Elyria, O. W8 ..... 7.65
FranklinPark, Ill. N5 ..... 7.65
Gary, Ind. R2 ..... 7.65
GreenBay, Wis. F7 ..... 7.65
Hammond, Ind. J5, L2 ..... 7.65
Hartford, Conn. R2 ..... 8.15
Harvey, Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield, Mass. B5 ..... 8.20
Massillon, O. R2 R8 ..... 7.65
Midland, Pa. C18 ..... 7.65
Monaca, Pa. S17 ..... 7.65
Newark, N.J. W18 ..... 8.10
NewCastle, Pa. (17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth, Mich. P5 ..... 7.90
Putnam, Conn. W18 ..... 8.20
Readville, Mass. C14 ..... 8.20
Seattle(49) S30 ..... 9.10
S. Chicago, Ill. W14 ..... 7.65
SpringCity, Pa. K3 ..... 8.10
Struthers, O. Y1 ..... 7.65
Warren, O. C17 ..... 7.65
Waukegan, Ill. A7 ..... 7.65
Willimantic, Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland, Md. (5) C19 ..... 6.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ..... 9.025
BeaverFalls, Pa. M12, R2 ..... 9.025
Bethlehem, Pa. B2 ..... 9.025
Bridgeport, Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden, N.J. P13 ..... 9.20
Canton, O. T7 ..... 9.025
Carnegie, Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.25
Detroit B5, P17 ..... 9.225
Detroit H5, S41 ..... 9.025
Donora, Pa. A7 ..... 9.025
Elyria, O. W8 ..... 9.025
FranklinPark, Ill. N5 ..... 9.025
Gary, Ind. R2 ..... 9.025
GreenBay, Wis. F7 ..... 9.025
Hammond, Ind. J5, L2 ..... 9.025
Hartford, Conn. R2 ..... 9.325
Harvey, Ill. R5 ..... 9.025
Lackawanna, N.Y. B3 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield, Mass. B5 ..... 9.325
Massillon, O. R2, R8 ..... 9.025
Midland, Pa. C18 ..... 9.025
Monaca, Pa. S17 ..... 9.025
Newark, N.J. W18 ..... 9.20
Plymouth, Mich. P5 ..... 9.225

S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.00
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 .5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 .5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ....6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, ENAMELING

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 .....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1.5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 .....5.10
S. SanFrancisco (25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 .....8.40
S. Chicago, Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 .....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1.7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 .....7.575
S. SanFrancisco (25) B3.8.325
SparrowsPoint, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 .....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn, Mich. S3 .....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 .....7.425
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 .....9.20
Franklin Park, Ill. T6 ..7.425
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.35
McKeesport, Pa. E10 ....7.525
NewBedford, Mass. R10.7.875
NewBritain, Conn. S15 ..7.875
NewCastle, Pa. B4, M23.7.425
NewHaven, Conn. D2 ...7.875
NewKensington, Pa. A6.7.425
Pawtucket, R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale, Ill. A1 .....7.425
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ...8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
Franklin Park, Ill. T6 ..15.55
Harrison, N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 .....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
Franklin Park, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 .....7.525*
McKeesport, Pa. E10 ..7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5.7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41 .....7.425*

Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.10	9.35	9.75
Fairless, Pa. U5	9.10	9.35	9.75
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless, Pa. U5	6.10	6.25	6.40	6.55
Gary, Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor, Ind. I-2	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W. Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.40	10.65
Fairless, Pa. U5	10.40	10.65
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.20
Fairless, Pa. U5 .....8.20
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
GraniteCity, Ill. G4 .....8.30
Ind. Harbor, Ind. I-2, Y1.8.20
Irvin, Pa. U5 .....8.20
Niles, O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
SparrowsPoint, Md. B2 ..8.20
Weirton, W. Va. W6 .....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 .....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2 ...8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 .....8.25
Kokomo, Ind. M16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
Palmer, Mass. W12 .....8.30
Pittsburg, Calif. C11 ....8.95
Portsmouth, O. P12 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Galv'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2 .12.65
KansasCity, Mo. U3 ...12.90
LosAngeles (2) B3 .....13.60
Minnequa, Colo. C10 ...12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ..12.95
PalmerMass. W12 .....13.70
Pittsburg, Calif. C11 ....13.45
Portsmouth, O. P12 .....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt. Md., (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.75
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.075
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ...9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Millbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 .....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8..16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 .....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S41 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 .....13.75
Portsmouth, O. P12 .....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 .....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S. Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) per 97 lb net box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.
100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
Los Angeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim
100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	
Cleveland A7	17.85	
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.10	19.70†
Pitts,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80†‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16.	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48) B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ⅛ in. larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:
Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: Plain Finish 50
Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in., and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.75	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.74	10.58	11.77	12.16	9.77	13.35	16.69	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.34	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.05	11.75	12.13	9.98	12.98	16.95	10.21	9.81	11.18
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	10.17	9.65	11.35	11.73	9.58	13.10	16.55	9.81	9.41	10.78
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	9.50	10.00	10.89	11.25	9.65	11.95	16.48	9.85	8.85	11.10
Pittsburgh	9.22	10.53	11.58	11.49	9.22	11.25	16.95	8.91	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.17	11.69	11.95	11.78	10.07	15.10	18.20	10.49	10.38	12.47
Seattle	11.35	12.45	13.40	12.80	10.80	10.20	17.80	11.59	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.01

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $200; Stevens Pottery, Ga., $210.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.90
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, (lump) 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.50-16.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill	(Per base box;
Products	100 lb base wt)
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating).	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Power

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckists, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ¼ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.00
Bronze powder, 90/10.	54.10
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	58.50
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.60	$5.65	$5.55	$5.45	$5.75
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.65	5.70	5.60	5.50	5.80
I-Beams	5.60	5.65	5.55	5.45	5.75
Channels	5.60	5.65	5.55	5.45	5.75
Plates (basic bessemer)	5.55	5.60	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.20	6.15	6.05	5.90	6.25
Merchant Bars	6.15	6.20	6.10	6.00	6.30
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.15	7.20	7.10	7.00	7.30

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contatined Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.06% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.65 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

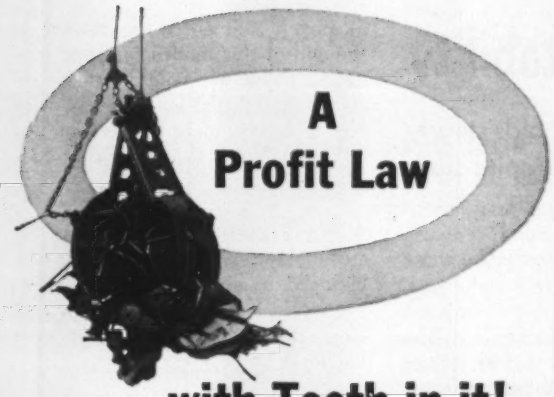
V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



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Scrap Showing Increased Stability

STEEL's composite on No. 1 heavy melting grade holds steady at $36.33 for third straight week. Market firm despite sluggish domestic demand. Export interest reviving

Scrap Prices, Page 114

● **Pittsburgh** — Dealers are more optimistic despite the lack of consumer buying. Export demand and strength in surrounding districts have put a floor under the market. Bids on No. 1 factory bundles from the local plant of GM's Fisher Body Div. are expected to be $1 to $2 a ton above last month's. Trade sources predict that brokers for a mill on the fringe of the district will have to pay dealers more than $35 a ton, delivered—the price paid last time—when they buy No. 1 heavy melting scrap at the end of the month.

● **Philadelphia** — While domestic buying is light, the scrap market is fairly strong due to a quickening in the export movement. More ships are available—four are loading here. Domestic prices are up $1 a ton on No. 2 bundles to $25, delivered. Prices on other grades are unchanged.

● **New York**—While scrap brokers' buying prices are unchanged, sentiment is better. Domestic demand remains spotty, a situation which applies to the cast grades and specialties, including stainless material and the major steelmaking grades. However, there's enough home consumption to help sustain the market. Export business is livelier.

● **Chicago**—The market continues quiet. District mills are not buying scrap—they appear to be adopting a wait-and-see attitude on what bid will take No. 1 factory bundles on the auto lists.

● **Buffalo**—Prices are steady as result of increased local mill operations and the continuation of fairly active export demand. There have been no new mill orders since the start of this month. District foundries have placed new orders for cast scrap at prevailing levels. Some dealers anticipate a sizable increase in mill orders for June delivery. Supplies are adequate for short term needs.

● **Cleveland**—The market is in the "wait and see" period just before the closing of monthend bids on the new automotive lists. Despite the absence of heavy buying, the market appears to be a little firmer, though prices are unchanged. Bids on the auto lists will point the way for prices over the coming month.

● **St. Louis**—The market appears to be a litle firmer, though no price advances are reported. Exporters are re-entering the market, especially for No. 1 heavy melting steel. Dealers are holding their stocks, anticipating price rises later, possibly in July and August.

● **Birmingham**—The undertone of the scrap market seems stronger, but no major price changes are noted. Structurals and plates are quoted $1 higher at $42-$43, and bar crops are also up $1 to $43-$44. The cast iron grades are weak. No. 1 wheels are off $1 a ton to $34-$35.

● **Houston**—Scrapmen anticipate a pickup in orders, but they don't look for any immediate rise in prices. A major district mill has indicated it will enter the market at the end of this month for June tonnage. Prices are holding at the recently established lower levels, with No. 1 heavy melting steel quoted $35, and No. 2 heavy melting $31-$32.

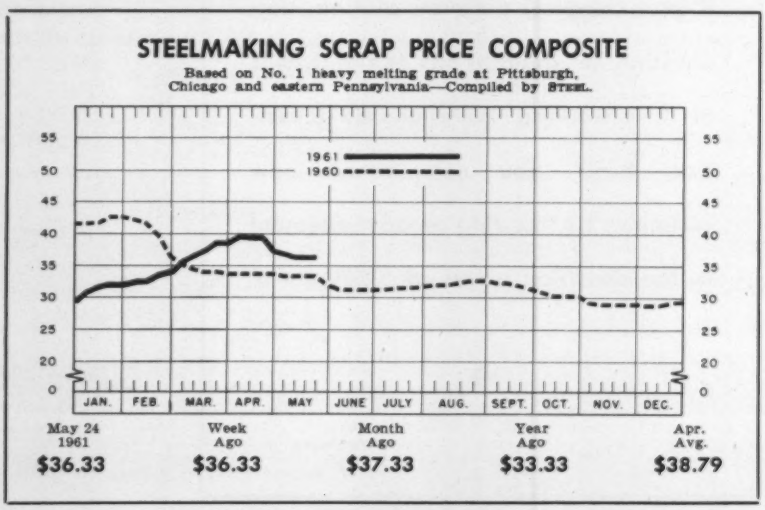
● **San Francisco** — Prices on the steelmaking grades of scrap are unchanged in a quiet market. However, No. 1 cupola cast is down $2 from the recently prevailing market level.

● **Seattle**—The market is firm, with the domestic mills buying and exporters accumulating tonnage for several full cargoes for delivery to Japan. In some cases, exporters have had to draw on their inventories because their receipts have been below requirements. The obsolete fleet of war built vessels (military and commercial) is a main source of scrap. Several hundred Liberty ships are in mothballs on the West Coast. Scrapping of that fleet is being urged.

● **Los Angeles** — The market continues weak; there is little demand in evidence either on domestic or export account. Yard intake is limited.

Scrap Consumption Jumps 13 Per Cent During March

Domestic consumption of ferrous scrap in March totaled 4,449,000 gross tons, a rise of 13 per cent over that in February, and the largest monthly use since June,



1960, reports the U. S. Bureau of Mines. The charge of scrap and pig iron, 8,580,000 gross tons, was also the largest since June, 1960, and consisted of 52 per cent scrap and 48 per cent pig iron—unchanged from February. March was the eighth straight month in which the use of scrap was greater than pig iron.

Consumer stocks of scrap on Mar. 31 totaled 7,689,000 tons vs. 7,670,000 at the end of February. Stocks of pig iron totaled 3,175,000 tons, off 2 per cent from the preceding month.

Home scrap produced in March accounted for 2,602,000 tons, 16 per cent more than in February. Purchased scrap received by consumers totaled 1,862,000 tons, 30 per cent more than during February. Of the purchased material, 85 per cent came from dealers and 15 per cent from other sources.

Tubular Goods . . .

Tubular Goods Prices, Page 107

Producers of raw steel pipe for rigid conduit have cut prices about 4 per cent ($7 a ton). The move was made to relieve the squeeze on manufacturers of rigid pipe that was brought about by a 5 per cent discount on galvanized pipe. The reduction was initiated a month ago by a producer who makes both pipe and conduit. Prior to the reduction, raw pipe for conduit averaged about $175 a ton.

Modest improvement in demand for tubular goods continues at the various production points. A southern pipemaker hopes to resume production at his pipe mill shortly.

The number of rotary oil drilling rigs operating in the U. S. decreased from 1775 to 1740 (reported in the latest weekly survey by the Hughes Tool Co.). Canada's total was up one, to 80 active rigs.

A stretch reducing tube mill with a broad size range and flexibility will be part of the combination pipe mill facilities that National Supply Div., Pittsburgh, Armco Steel Corp., will install at its expanded and modernized Ambridge (Pa.) plant.

The mill will be supplied by the Aetna-Standard Div. of Blaw-Knox Co., Pittsburgh. It will size and stretch reduce three types of pipe —seamless, continuous buttweld, and electricweld—in an over-all range of ½ to 8⅝ in. OD. The mill will produce 80 tons per hour; its maximum finishing speed is 2000 ft per minute.

Pig Iron . . .

Pig Iron Prices, Page 108

Merchant pig iron business is improving, although it is far from brisk and lagging considerably behind the sharp upswing in steel demand. Producers of iron used in steelmaking are stepping up operations gradually.

U. S. Steel Corp. may soon blow in a blast furnace at its Ohio Steel Works, Youngstown. One producer in the Birmingham district says he "wouldn't be surprised" if he puts another blast furnace in production "in the next 30 to 60 days." He says "we haven't cleaned out the yards of pig iron, but we're short on certain grades."

Pig iron from the new plant of Consolidated Mining & Smelting Co., Kimberly, B. C., is being shipped to a Seattle foundry on a trial basis. In the past, plants in the Pacific Northwest have depended largely upon imports from Australia and South Africa. The Canadian product is delivered at a price $1 or more under African prices and may be an important factor in that area in the future.

Steel Bars . . .

Bar Prices, Page 103

Demand for commercial carbon bars shows some gains compared with a month ago, but, in general, ordering is spotty, and there has been little noticeable change in delivery promises which still range two to four weeks. Consumers appear to be buying against requirements in sight. They are doing relatively little stockpiling.

Forging shops and bolt and nut manufacturers appear to be well stocked with hot bars and are specifying lightly. The same can be said for producers of cold drawn bars. Bar needs of machinery and equipment makers are inching up slowly, but automotive requirements are light, though in a little

(*Please turn to Page* 120)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, May 24, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 24	$36.33
May 17	36.33
Apr. Avg.	38.79
May 1960	33.07
May 1956	50.34

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
No. 1 factory bundles	41.00-42.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	16.00-17.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	*38.00-39.00*
3 ft and under	*37.00-38.00*
Heavy turnings	27.00-28.00
Punchings & plate scrap	41.00-42.00
Electric furnace bundles	*41.00-42.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	35.00-36.00
Stove plate	35.00-36.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	41.00-42.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	36.00-37.00
No. 1 hvy melt., dealer	34.00-35.00
No. 2 hvy melting	28.00-29.00
No. 1 factory bundles	39.00-40.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	36.00-37.00
No. 1 busheling, dealer	34.00-35.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	39.00-40.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	36.00-37.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
R.R. malleable	46.00-47.00
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Angles, splice bars	41.00-42.00
Axles	57.00-58.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles, solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	61.00-62.00
Railroad specialties	41.00-42.00

CLEVELAND

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	38.00-39.00
No. 1 bundles	34.00-35.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	34.00-35.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	38.00-39.00
Low phos. punchings & plate	35.00-36.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	45.00-46.00
Burnt cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	47.00-48.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	48.00-49.00
Cast steel	39.00-40.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	41.00-42.00
Angles, splice bars	43.50-44.50
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	70.00-75.00
430 turnings	15.00-25.00

YOUNGSTOWN

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	37.00-38.00
No. 1 bundles	37.00-38.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	38.00-39.00
Electric furnace bundles	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	31.00-32.00
No. 2 bundles	19.00-20.00
No. 1 busheling	30.00-31.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	46.00-47.00
Rails, random lengths	40.00-41.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	38.00-40.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	42.00
No. 2 bundles	*25.00*
No. 1 busheling	41.00-42.00
Electric furnace bundles	43.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	52.00-54.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
No. 1 busheling	27.00-28.00
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	10.00-11.00

Cast Iron Grades

No. 1 cupola	31.00-32.00
Mixed cast	29.00-30.00
Stove plate	25.00-26.00
Heavy breakable	24.00-25.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	37.00-38.00

Stainless Steel Scrap

18-8 bundles & solids	165.00-170.00
18-8 turnings	65.00-70.00
430 bundles & solids	65.00-70.00
430 turnings	15.00-20.00†

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	32.00-33.00
No. 2 bundles	19.00-20.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	21.00-22.00
Bar crops and plates	*43.00-44.00*
Structurals & plate	*42.00-43.00*
Electric furnace bundles	36.00-37.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	40.50-41.50
Angles, splice bars	42.00-43.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	40.00
2 ft and under	44.00-45.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	43.00

LOS ANGELES

No. 1 heavy melting	38.00-40.00
No. 1 hvy melt (export)	40.00-42.00
No. 2 heavy melting	34.00-37.00
No. 2 hvy melt (export)	37.00-39.00
No. 1 bundles	30.00-31.00
No. 2 bundles	25.00
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	52.00

Cast Iron Grades

No. 1 cupola	44.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace bundles	52.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	37.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00
Electric furnace bundles	50.00

Cast Iron Grades

No. 1 cupola	*44.00*
Heavy breakable cast	39.00
Unstripped motor blocks	39.00-40.00
Stove plate (f.o.b. plant)	37.00

SAN FRANCISCO

No. 1 heavy melting	41.00**
No. 2 heavy melting	38.00**
No. 1 bundles	34.00**
No. 2 bundles	27.00**
Machine shop turnings	18.00**
Mixed borings, turnings	18.00**
Cast iron borings	18.00**
Heavy turnings	18.00**
Shovel turnings	18.00**
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	*46.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Broker's buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

Another MX Test System at work...

Stainless steel seamless tube passes through loading, penetrant, emulsifier and water wash stations of automatic Zyglo Test Unit. Lower view shows complete unit with inspector at right. Installation is 33' x 50' x 11', biggest automatic Zyglo yet built. Shipped to Ellwood City plant of National Tube Division, U. S. Steel Corporation.

Better Stainless Seamless Tube--with Automatic Test

Reliable Crack Detection—by Fluorescent Penetrants

Where end-service is critical, as in nuclear reactors, thorough but efficient testing is required. This, the largest automatic Zyglo-Pentrex Unit yet built,—is engineered and produced by Magnaflux. It tests stainless steel seamless tubing, in lengths to 40 feet, in sizes from ½" to 10¾" OD. Processing of tubes up to 3½" D. takes about 3 minutes each; larger sizes, weighing up to 4,000 lbs., about 6 minutes. Heavy duty vee-fixture conveyors handle loads as high as 20 tons at a time.

All operation is fully automatic, except for actual inspection. Tubes are conveyed through the specially engineered, time-sequenced flooding stations for penetrant, emulsifier, water wash and wet developer, drying, and finally to the hooded inspection area. Here, power rotated under a battery of high wattage black lights, fluorescent indications show all seams or cracks, and are marked by the inspector. Run-out rollers then remove tubes from the unit.

This Zyglo unit is another example of Magnaflux' capability to engineer and manufacture complete testing-handling systems for seamless and welded tubing, billets and tube rounds—in any capacity, for any nonmagnetic or magnetic metal.

The unique experience we have thus developed is at your service,-to improve your output, simplify testing and cut costs. Phone our local MX Field Engineer or write to Magnaflux Corporation, 7312 W. Lawrence Avenue, Chicago 31, Illinois.

MAGNAFLUX CORPORATION
TEST SYSTEMS

A SUBSIDIARY OF GENERAL MILLS

MX Test Systems Include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD

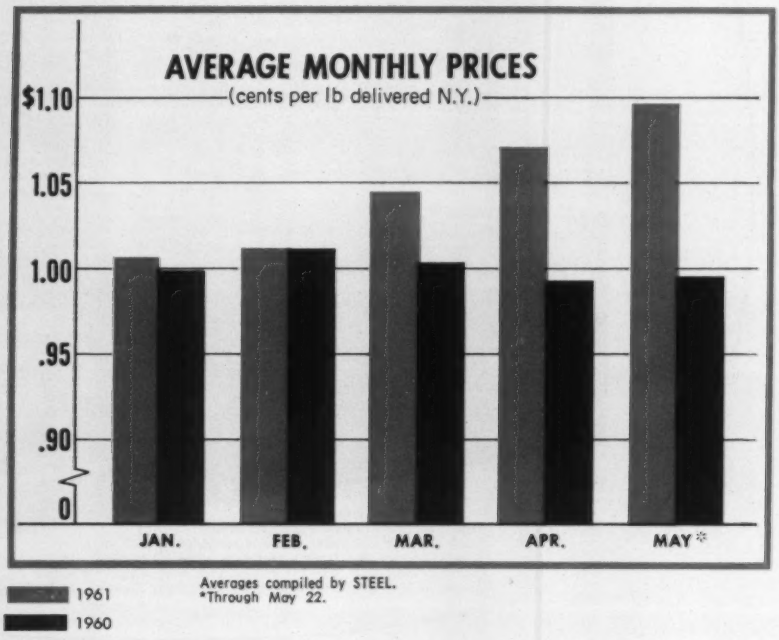
How High Will Tin Prices Go?

Nonferrous Metal Prices, Pages 118 & 119

ASK FIVE MEN in the tin industry that question, and you'll get five different answers.

The situation points up the one thing on which everyone agrees: The tin market has been in a complex, bothered, and bewildered state for the last three months. The price (delivered in New York), which hovered around a modest $1.00 to $1.01 a pound in January and February, has been climbing steadily (see graph) and was up to $1.10875 a pound as STEEL went to press. (On May 17, the price shot up to $1.1125 a pound, the highest since the Suez Canal crisis back in 1956.)

There's no mystery about what put the frenzy in the market. Production is hampered by the closedown of mining facilities in the Congo, multiple troubles in Bolivia, and bad weather and politics in Indonesia. Coming at a time of rising consumption, those developments have caused fears of a metal shortage this year. Widespread speculation has created additional hysteria and pushed the price up.



• **Where We Stand**—But the problems aren't as big as factors would have you believe, nor are they as minor as other sources make out. Some of the big consumers, like major tin platers in particular, are well stocked. Some smaller users aren't in such good shape.

• **End May Be Near**—The current bull market may be nearing a climax. Here's why:

• Odds are good that the U. S. will soon authorize disposal of 4000 tons of tin being held at Texas City, Tex.—it's in the custody of the General Services Administration. The material was acquired when the government operated a tin smelter there. Since the metal does not come under one of the government stockpile programs, it would be relatively easy to dispose of it.

• Canada is considering releasing about 3000 tons from its stockpile.

• If things really get tight, pressures would build up for release of metal from the gigantic U. S. national stockpile. (Some estimate it would supply all U. S. tin requirements for six to eight years.) This requires Congressional action.

• Some of the producing nations are boosting output as far as they can. There's hope that Congo tin may be filtering back into the market before yearend. Reports indicate some metal is being mined in the Congo, but no shipments are being made.

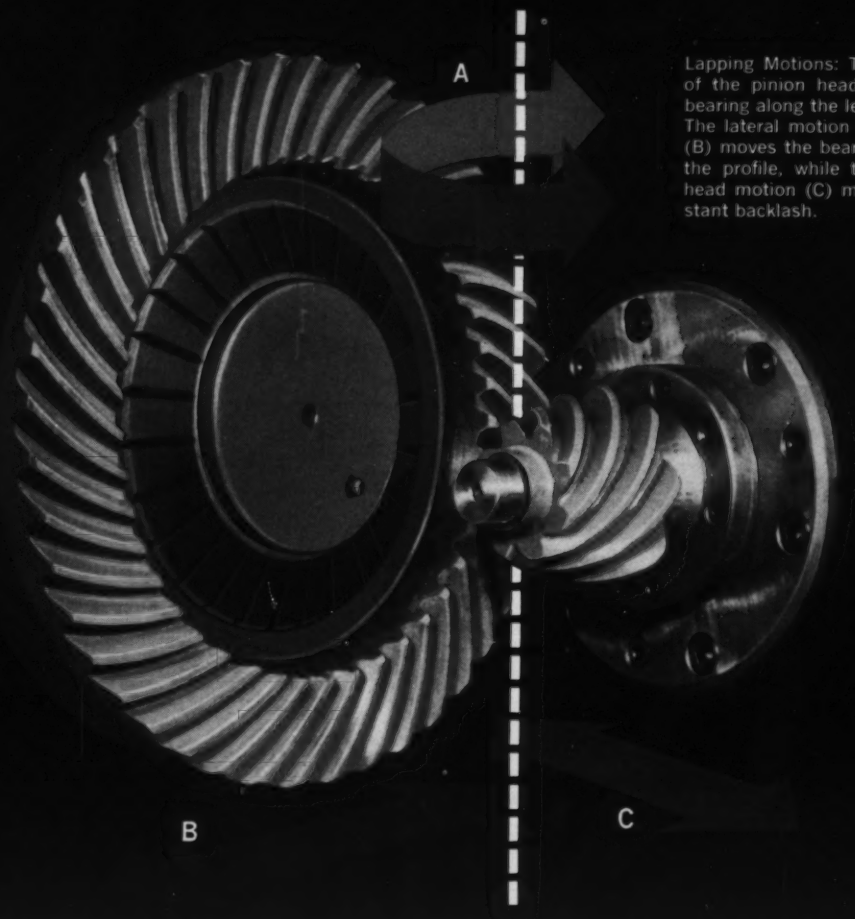
• The International Tin Council's buffer stock manager is required to sell tin when the price reaches the equivalent of $1.10 a pound in London. (It had edged over $1.09 a pound last week.) Under the laws of the Tin Council, which was set up to prevent extreme fluctuations in price, the buffer manager can begin selling at about $1.05 a pound. He has been doing that, although it's believed only a small fraction of the estimated 10,000 tons held in stock has been put on the market.

Some measures will be taken to bring relief to the market. Whether they'll be soon enough to bring an early halt to the price spiral, or big enough to eliminate any possible shortage, remains to be seen.

Price Problems in Zinc

Price shading has again become a much discussed problem in the zinc industry. Early in the year, the market was in a furor as competitive pressures brought heavy dis-

(*Please turn to Page* 119)



Lapping Motions: The swing motion of the pinion head (A) sweeps the bearing along the length of the tooth. The lateral motion of the gear head (B) moves the bearing up and down the profile, while the lateral pinion head motion (C) maintains the constant backlash.

New "Swing Pinion Cone" motions lap gears to 26" diameter automatically

Several design innovations in the new Gleason No. 504 Lapper combine to offer you a *more flexible* machine, *more accurate* results; a machine that will give you *more consistent* gear sets.

The new *SPC** motions allow a more rigid design—and the gear tooth surface responds more quickly and more consistently than to the previous types of lapping motions. Production rates are substantially increased.

The swinging motion of the pinion head sweeps the tooth bearing area along the length of the tooth, while horizontal motions of both heads move the bearing up and down the tooth profile, while maintaining uniform backlash.

Servo Controls provide for simpler setup and operation, and further contribute to increased speed and accuracy. All lapping motions are established by simple dial settings. This electrical control is positive and fast acting.

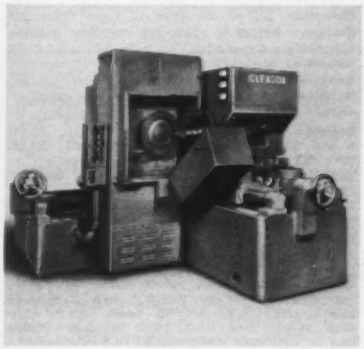
You can lap hardened spiral bevel and hypoid gears with 90° shaft angles, and conventional gears with shaft angles from 50° to 110°. Add an angle plate for the pinion head and you extend the work range from 10° to 160°.

An optional variable speed drive motor permits spindle lapping speeds from 200 to 2000 RPM.

No cams or special parts are required from job to job other than arbor equipment.

For more information and specs, write us. We'll be glad to send full details promptly.

*SPC means "Swing Pinion Cone."



No. 504 Hypoid Lapper

GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N. Y.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg. 36.00-37.50 per gram; 1-10 kg. 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $203-205 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb. f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 111.00.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Die casting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max., 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 68.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 198.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-106.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 23.75-24.25; light copper, 21.25-21.75; No. 1 composition red brass, 22.00-22.50; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61–51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	34.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.625
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 21.00-21.50; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 19.00-19.50; brass pipe, 19.00-19.50.

Lead: Soft scrap lead, 7.25-7.75; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00, turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.50-4.00; new diecast scrap, 3.50-4.00; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.75-12.25; segregated high copper clips, 10.75-11.25; mixed low copper clips, 11.25-11.75; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00; segregated high copper clips, 13.50; mixed low copper clips, 13.50; mixed high copper clips, 13.00-13.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery) **Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 29.75; No. 2 heavy copper and wire, 27.75; light copper, 25.50; refinery brass (60% copper) dry copper content, 26.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.50-29.00; No. 2 heavy copper and wire, 26.50-27.00; light copper, 24.50-24.75; No. 1 composition borings, 23.50-24.50; No. 1 composition solids, 24.00-25.00; heavy yellow brass solids, 18.50-19.00; yellow brass turnings, 17.00-17.50; radiators, 19.00-20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60. **Copper:** Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 109.00; 500-1999 lb, 102.00; 2000-4999 lb, 98.50; 5000-29,999 lb, 97.50; 30,000 lb, 96.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 129.50; 200-499 lb, 128.00; 500-999 lb, 127.50; 1000 lb or more, 127.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadimum Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 84.20; 100-600 lb, 74.50; 700-1900 lb, 71.80; 2000-9900 lb, 69.90; 10,000 lb or more, 68.20.

Stannous Chloride (Anhydrous): 25 lb, 175.00; 100 lb, 141.70; 400 lb, 131.70; 800-19,900 lb, 110.40; 20,000 lb or more, 106.20.

Stannous Sulphate: Less than 50 lb, 144.40; 50 lb, 119.40; 100-1900 lb, 117.40; 2000 lb or more, 115.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 116*)

counting. Then things quieted.

Discounting is again causing wide concern. Earlier this month, the premiums on special high grade and high grade zinc were officially lowered 0.5 cent a pound because offers were being made at about a half cent below the quoted price.

Trade sources report the discounting hasn't stopped. If it continues, there may be further cuts in the quoted price for premium grades, they say.

CLASSIFIED ADVERTISING

Help Wanted

MECHANICAL AND ELECTRICAL ENGINEERS

We have supervisory positions open in our Maintenance Departments for engineers with a college degree and 5 to 8 years steel mill experience. Excellent opportunities for advancement. Send complete resume, including salary requirements to:

Personnel Services Dept.

KAISER STEEL CORP.
P. O. Box 217
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All qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

Machinery and Equipment Wanted

WANTED
Used
ROLL FORMING MACHINE

For forming metal ribbed roofing sheets, to accommodate 36" sheet minimum width. Quote giving make, number of stations, spindles diameter, girth opening, roll pitch vertical adjustment and all details and specifications. No tooling required.

Reply Box 935, STEEL
Penton Bldg., Cleveland 13, Ohio

WANTED

Machinery for Structural Steel and Plate Shop:

Shears	Punches
Plate Rolls	Presses
Flanging Machine	Drills

Furnish full details, price. Replies confidential. Box 932, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind.

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

For Sale

FOR SALE

Available at a good reduction under mill price steel sheets and plates, limited quantity only, range plates 3/8", 5/16", 1/4", 3/16", any width up to 60" maximum or decimal equivalent, sheets 7, 8, 9, 10, 11, 12, 13, and possibly 14 gauge up to 60" in width, specifications per your choosing from SAE 1005 to SAE 1050, plain, pickled dry, or pickled and oiled available, depending on specifications. Can also supply coils. All material from domestic manufacture off continuous mill. Exact sizes can be supplied. Must have complete specications and delivery point so that proper quotation can be given. Prefer end-users, however, will accept serious inquiries from resellers. If interested, write:

Box 936, STEEL
Penton Bldg., Cleveland 13, Ohio

—FURNACES—SAVE AT LEAST 50%—
ARC MELTING
1000 lb. LECTROMELT, 250 KVA
2000 lb. SWINDELL, 1000 KVA
9' TOP CHARGE, 2000 KVA
INDUCTION
50 KW to 200 KW TOCCO Mtg. Units
700 KW AJAX mtg. complete, like new
Universal Machinery & Equipment Co.
Box 873 Franklin 3-5103 Reading, Pa.

Business Opportunities

Tools, molds, inventory, and patent rights for manufacture of lightweight hydraulic lifts. Price: $40,000.

Paul H. Chapman, Broker
1182 W. Peachtree St., Atlanta, Ga.

MODERN PLANTS—WANTED

Facilities for fabricating structural steel (1500 tons mo.) Welded Steel Pipe, plate shop.

Shipbuilding facilities barge yard.

Furnish blueprint of layout, buildings, list machinery all equipment.

Plants preferably located in South must be located near steel mills.

State banking connections asking price required. All replies treated in strictest confidence.

Reply Box 933, STEEL
Penton Bldg. Cleveland 13, Ohio

(*Concluded from Page* 113)

larger volume than they were earlier this spring.

Shipments of Light Gage Steel Products Dominate

Light gage products accounted for 71 per cent of the 71 million net tons of finished steel shipped from the mills last year, reports the American Iron & Steel Institute. The remaining 29 per cent was heavy products, which include plates, structurals, rails, and pipe.

The growth of the light gage products (sheets and strip, tin mill items, wire, bars, and tubing) has been an outstanding development in the steel industry. Those products figure prominently in the production of automobiles, kitchen equipment, and other consumer goods.

Shipments of all types of sheets and strip (including electrical sheets and galvanized sheets) accounted for 40.7 per cent of total steel shipments. Electrolytic tin plate shipments at 5,075,500 net tons and galvanized sheet shipments at 3,057,000 tons set records.

Changing market trends have helped the growth of the light gage products. They are being widely used in construction, in electrical machinery and equipment, appliances, utensils, and cutlery.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

Producers of reinforcing bars are under a little stronger pressure for deliveries. It is forcing a stepup in production by mills holding heavier backlogs. One southern steelmaker has raised steel production about 10 per cent the last week or so, primarily because of increased demand for reinforcing bars.

Highway work and general construction are taking sizable tonnages of reinforcing steel throughout the country. However, cool, damp weather is holding up construction starts at some points.

The Bridge Department, California Department of Public Works, paid an average of 0.097 cents a pound for reinforcing bars in 1960 vs. 0.113 cents in 1959. The department bought 131,268 tons of reinforcing bars last year.

Distributors . . .

Prices, Page 108

Mill delivery promises will have to get tighter before there is any particular spurt in bookings by steel service centers. However, May business is a shade larger than April's, or about equal to that of March, the best month so far this year. June orders may register an increase.

Some distributors believe the improvement will develop because of the buying for maintenance and repair which usually takes place during mass vacation periods at various steel consuming plants—they begin early in July. To meet the expected increase in demand, distributors are beefing up their inventories of many items.

Mill deliveries on some items are stretching slightly, but there is no panic among buyers — which indicates that steel consumers are maintaining adequate stocks.

The price situation in the Northwest continues weak, although less competition from importers is noted.

Steel Shipments by Markets — March, 1961

(Net tons; all grades)

	March		Year To Date	
Markets:	**1961**	**1960**	**1961**	**1960**
Converting & Processing	210,562	396,331	551,679	1,136,739
Forgings (except auto)	63,018	106,080	173,576	330,513
Fasteners	67,971	139,696	200,001	419,736
Warehouses:				
Oil & Gas	117,028	117,148	299,864	428,772
All Other	880,154	1,292,710	2,206,368	3,972,599
Total Warehouse	997,182	1,409,858	2,506,232	4,401,371
Construction:				
Oil & Gas	151,827	193,113	403,131	585,473
All Other	550,442	760,326	1,451,140	2,252,218
Total Construction	702,269	953,439	1,854,271	2,837,691
Contractors' Products	305,305	402,061	784,009	1,194,102
Automotive:				
Vehicles, Parts	679,291	1,626,628	2,254,625	5,127,455
Forgings	28,876	68,690	78,395	183,330
Total Automotive	708,167	1,695,318	2,333,020	5,310,785
Rail Transportation:				
Rails, Track, etc.	39,711	85,519	114,230	282,225
Cars, Locomotives	77,722	235,404	238,622	690,344
Rapid Transit	3,498	5,347	10,615	11,614
Total Railroad	120,931	326,270	363,467	984,183
Shipbuilding	49,299	60,067	141,230	198,586
Aircraft (inc. forgings)	5,441	8,064	16,961	25,569
Oil & Gas Drilling	29,057	45,864	89,526	169,694
Mining, Quarrying, etc.	22,352	30,040	61,831	91,566
Agricultural:				
Machinery	69,228	95,573	184,566	305,251
All Other	27,250	23,277	64,624	78,524
Total Agricultural	96,478	118,850	249,190	383,775
Machinery & Tools	309,363	490,518	819,480	1,440,586
Elec. Machinery, Equipment	163,048	225,858	439,210	692,121
Appliances, etc.	148,670	233,075	400,907	643,371
Other Equipment	146,731	209,533	403,440	593,068
Containers:				
Cans & Closures	454,170	542,622	1,386,465	1,494,697
Barrels, Drums, etc.	63,792	92,020	178,173	284,336
All Other	29,433	71,250	90,905	200,762
Total Containers	547,395	705,892	1,655,543	1,979,795
Ordnance, Military	14,401	10,752	40,135	36,190
Exports	168,009	199,936	370,974	502,134
Nonclassified	170,874	198,379	463,743	595,392
Total Shipments	5,046,523	7,965,881	13,918,681	23,966,967

Data from American Iron & Steel Institute.

Structural Shapes . . .

Structural Shape Prices, Page 103

While structural market activity is up seasonally, the volume is not as great as had been anticipated earlier this spring. However, contracts are diversified, including public construction projects and commercial and industrial jobs.

Competition among fabricators continues sharp because their backlogs are relatively small and increasing slowly. Steel is available from the mills on short notice; shipment promises on standard structurals range two to four weeks, depending on rolling cycles. Deliveries of wide flange sections are a little more extended.

Levinson Steel Co., Pittsburgh, will fabricate and erect the steel for the approaches to the Ft. Duquesne Bridge at Point Park, Golden Triangle, Pittsburgh. The company will also erect a bridge on Route 51 near Donora, Pa. It is completing a bridge at Monroeville, Pa. Nearly 4000 tons of structurals are involved in the jobs.

Bridge construction in California last year set an all-time record—

$127,862,803. Some 143 contracts and 531 structures were involved. The annual rate of construction for the next several years is expected to stabilize near $100 million.

, Structural steel bookings in Canada were off about 22 per cent in the first four months of 1961 compared with the same 1960 period. Total steel tonnages booked to the end of April were estimated at 89,000.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, Morrison Bridge interchange, Portland, Oreg., to Pacific Coast Div., Bethlehem Steel Co., Seattle; J. W. Conley and Hannan Bros., Portland, joint low at $2,419,846 to the Oregon Highway Commission.

300 tons, tire fabric treating building, United States Rubber Co., Winnsboro, S. C., to an unnamed fabricator.

2360 tons, West Penn Power Co.'s Mitchell Station, unit No. 3, Courtney, Pa.; placed by Sanderson & Porter Co., New York; 1900 tons of structural supporting steel went to Pittsburgh-Des Moines Steel Co., Pittsburgh, and 460 tons of bunker steel to the Ingalls Iron Works, Verona, Pa.

1315 tons, Alexander's Department Store, Paramus, N. J., through George A. Fuller Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

570 tons, Christ the King High School, Brooklyn, N. Y., through Castagna & Son, Manhasset, Long Island, N. Y., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, office and warehouse, General Electric Co., Seattle, to the Pacific Coast Div., Seattle, Bethlehem Steel Co.; George Teufel Co., Seattle, is general contractor.

240 tons, bottle plant, Plax Corp., Yardville, N. J., through Mahoney-Troast Construction Co., to Bethlehem Fabricators, Bethlehem, Pa.

STRUCTURAL STEEL PENDING

15,000 tons, state office building No. 12, Albany, N. Y.; bids June 14.

10,000 tons, 37 story office building, 330 Madison Ave., New York; bids closed May 18; George A. Fuller Co., New York, engineer in charge.

3000 tons, Courts building, Rochester, N. Y.; bids closed May 18.

5000 tons, University Teaching Hospital, Syracuse, N. Y.; bids June 7.

3605 tons, state highway work, FIGE 61-1, Kings County, New York; bids closed May 25.

3000 tons, Mary Simkhovitch Houses, New York; Joseph P. Blitz Co., New York, low on the general contract.

2500 tons, paper mill, Federal Paper Board Co., Versailles, Conn.; bids in.

2145 tons, state bridgework, FISH 61-11, Broome County, New York; bids closed May 25.

1845 tons, Indian Point nuclear station, Buchanan, N. Y., Ebasco Services, New York; bids closed.

1580 tons, state highway project, Sec. 5 N, Bergen County, New Jersey; bids closed May 23.

1060 tons, changes, terminal railroad bridge, Kansas City, Kans.; bids closed May 25.

1000 tons, school, Congregation Emanu-El, 10 E. 66th St., New York; bids rejected.

300 tons, Bishop Ford High School, Brooklyn, N. Y.; John B. Kennedy Co., New York, low on the general contract.

670 tons, state highway bridge, FISH 61-14, Monroe County, New York; bids closed May 25.

500 tons, Long Island bridgework, Woodside, Long Island, N. Y.; pending.

350 tons, fieldhouse, Princeton University, Princeton, N. J.; bids June 5.

300 tons, building addition, Grayson Robinson Stores, New York; pending.

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TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

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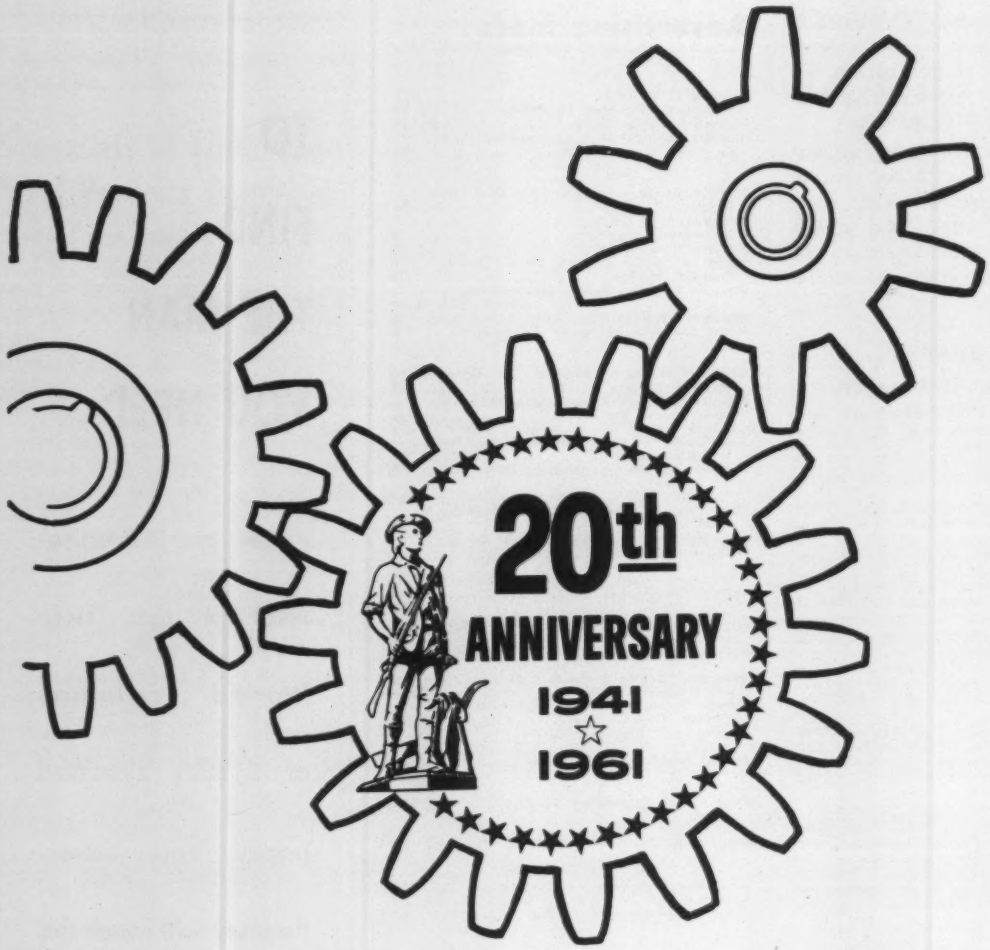

AT THE HEART OF THINGS

This 20th anniversary of the U. S. Savings Bonds program is an important milestone for the 45,000 companies, large and small, which offer the Payroll Savings Plan to their employees. Payroll Savings is the heart of the bond program, and the means by which millions of families have seen dreams realized since 1941. It has been good for business and industry... good for local communities... good for the nation's economic welfare. Above all it is good for the citizen who sees in each Savings Bond a share in his country's future.

If yours is one of the 45,000 participating companies, this anniversary year offers a good reason for renewed promotion. For help and suggestions, contact your State Savings Bonds Director, or write: **U.S. Savings Bonds Division, Treasury Department, Washington 25, D.C.**

U.S. SAVINGS BONDS DIVISION—
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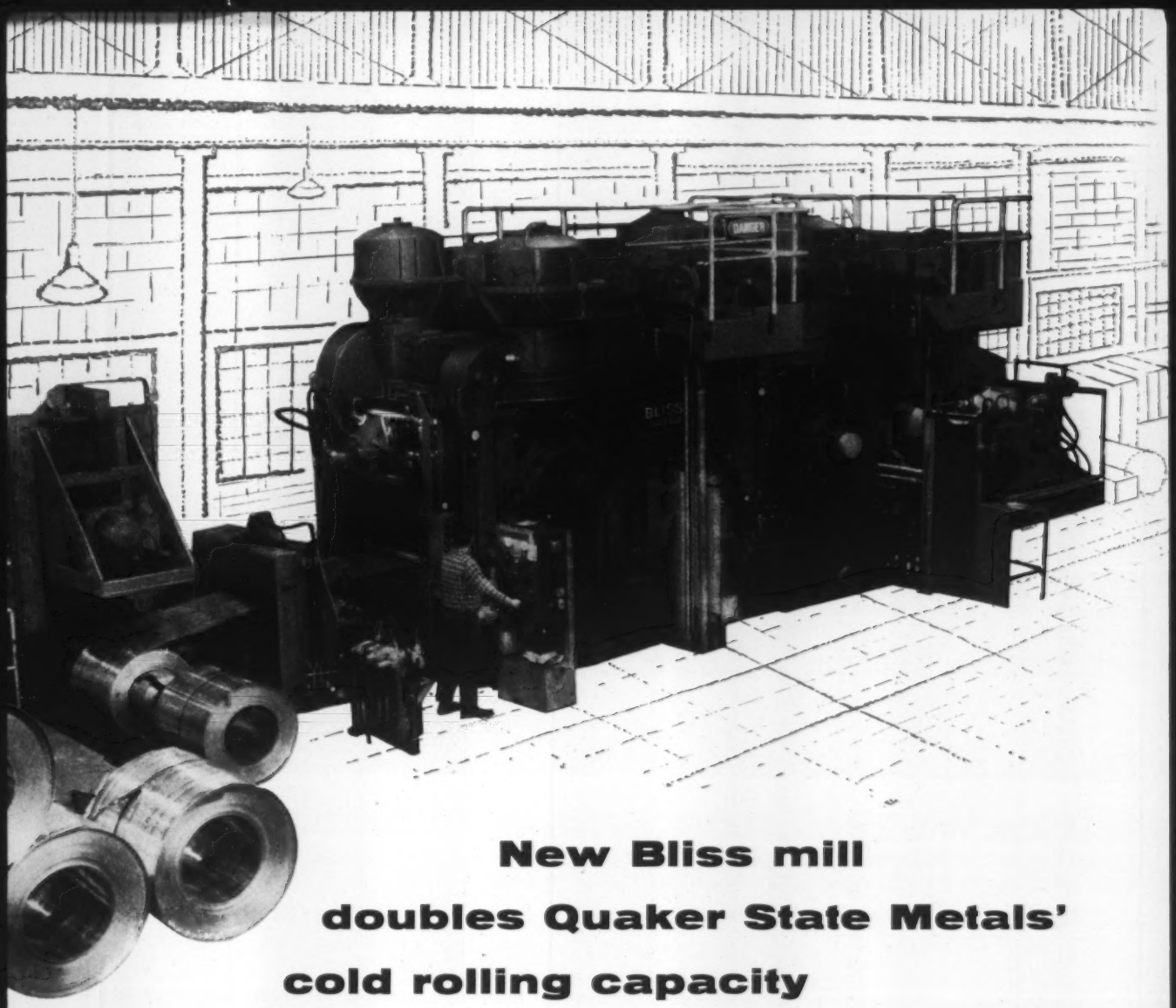

New Bliss mill doubles Quaker State Metals' cold rolling capacity

With a rolling capacity now approaching 10 million pounds a month, Quaker State Metals Company of Lancaster, Pa., division of Howe Sound Co., ranks as one of the largest independent rollers of aluminum in the United States.

A new Bliss tandem mill is a key unit in Quaker State's recently completed expansion program. In production a week after its erection was completed, the mill has more than doubled the plant's cold rolling capacity.

It reduces strip from .250 inch to .062 inch in a single pass. Delivery speed is 1500 fpm. Coil handling is completely mechanized, utilizing a coil opener equipped with a peeler knife and an automatic guide control.

Whether your own plans call for the addition or modernization of a single unit or a complete rolling plant, you'll find that the Bliss Rolling Mill Division can help you with the problems you may encounter. For examples of Bliss installations for rolling both ferrous and non-ferrous materials, write for our 84-page Bulletin 40-B.

BLISS
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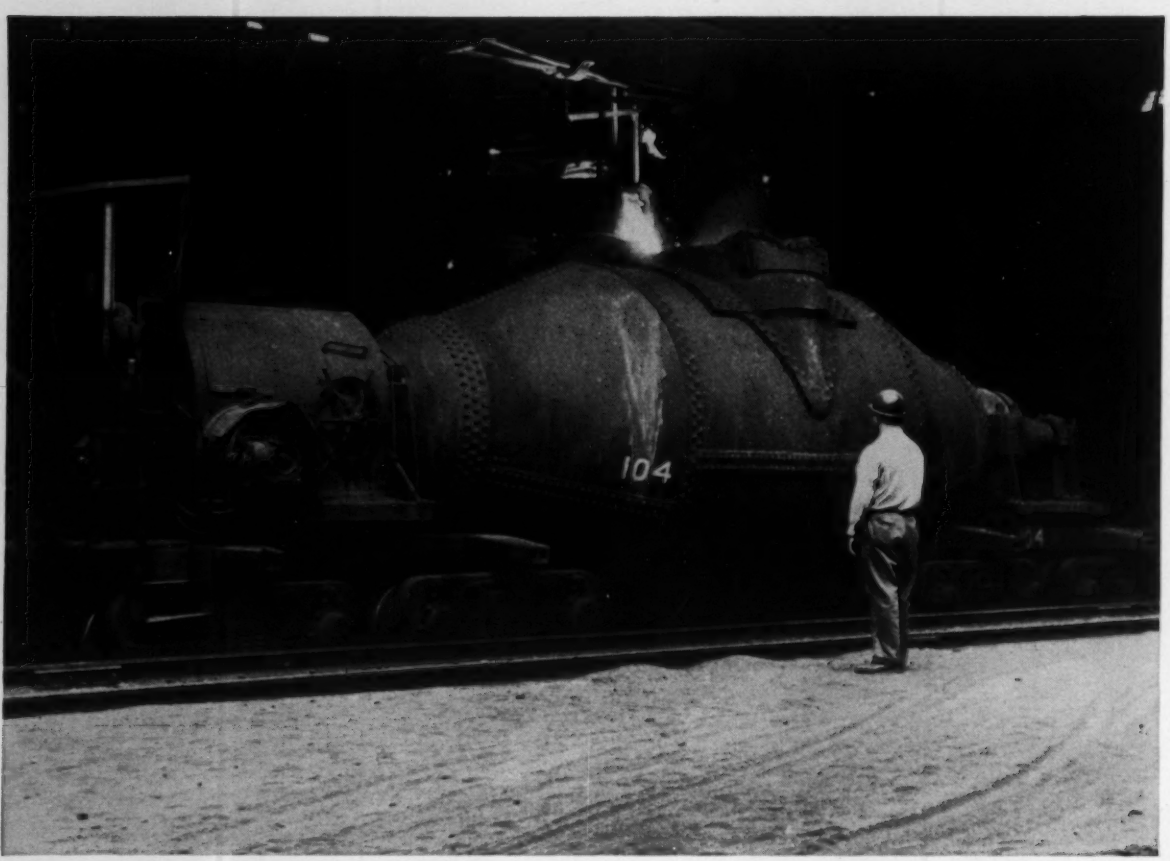
Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



How mixer-type hot metal cars roll cool at J & L Aliquippa

Transporting *all* the iron produced at Jones & Laughlin's Aliquippa Works is the big job done by fourteen mixer-type hot metal cars like the one shown above. To make sure wheel bearings run cool and keep running even under heaviest loads and impacts, car builder M. H. Treadwell Co. Inc., specified Timken® tapered roller bearings for all the car journals. Because they roll the load, Timken bearings practically eliminate friction. Cars start and roll easier, save power. Because of their taper, Timken bearings take any combination of radial and thrust loads. And full-line contact between rollers and races gives Timken bearings extra load-carrying capacity. Bearings run longer, smoother. Axles run true, minimizing wheel and rail wear. Maintenance is reduced to a minimum.

CALL ON US for expert on-the-spot engineering service on your bearing applications. Our graduate engineer salesmen will gladly work with you right at the design stage. And from the thousands of sizes and wide range of types of Timken bearings they will help you select the one bearing and mounting design that will do the most economical job for you.

Industry rolls on

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